the OIL AND GAS JOURNAL

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The Cavalcade of Oil

NUMBER TWELVE OF A SERIES

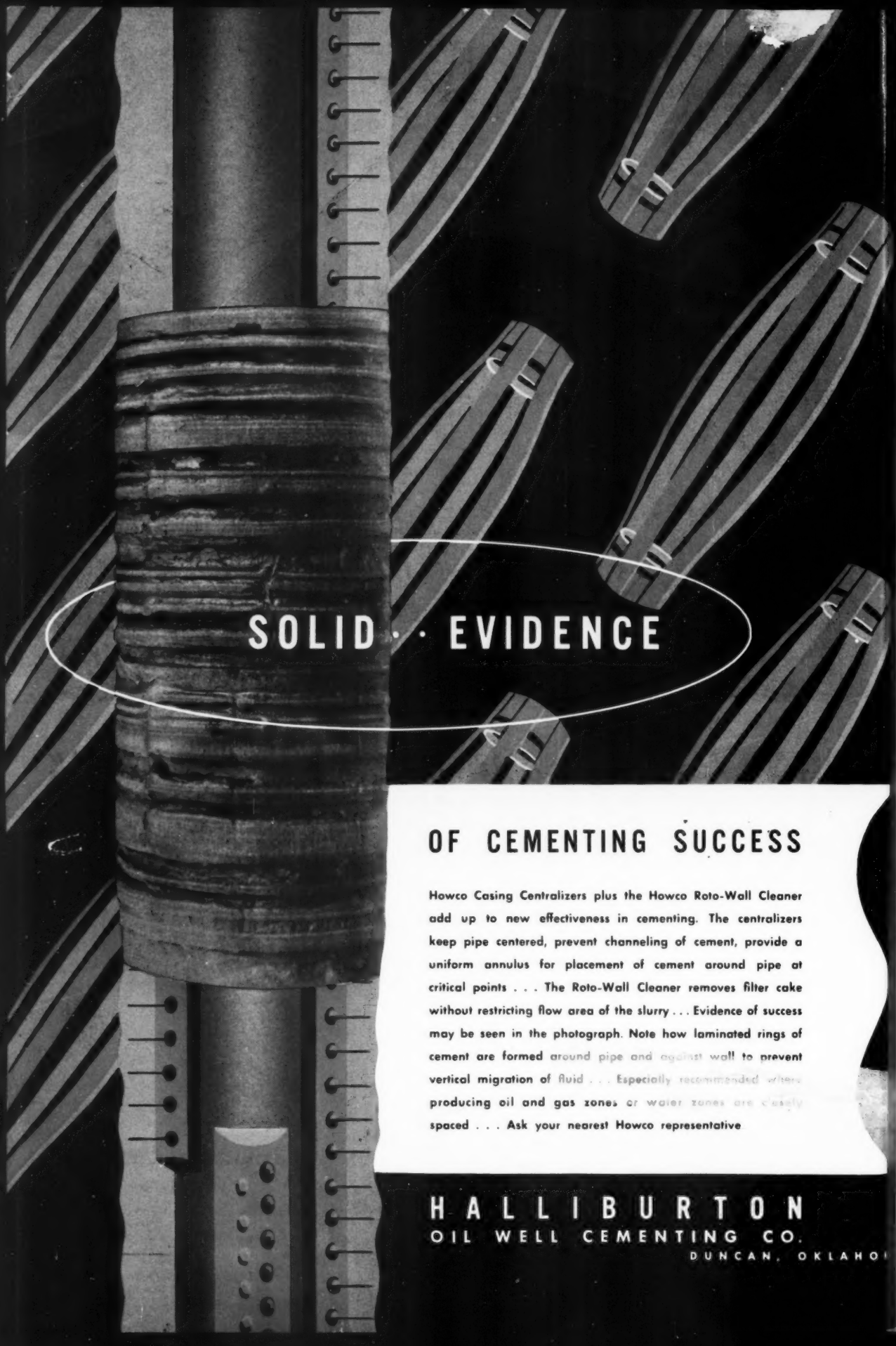
TOMORROW'S HORIZONS *in the Oil Industry are brightened by the genius of American Invention, Scientific Methods and Modern Machines. Intuitive creation of half a century will be surpassed by equally phenomenal, yet equally sound, achievements of tomorrow on the road of progress and development.*

Born of the Spindletop discovery well in Texas in 1901, the American Petroleum Industry has matured into the world's greatest industrial power. Although American fields constitute only one-eighth of oil land potentials in the world, the American Petroleum Industry produces two-thirds of the world's oil. Its scientific research has produced a multitude of products from nature's crude, which have shaped the course of civilization. Hundreds of tankers, thousands of tank cars and barges, a quarter of a million trucks and some one hundred fifty thousand miles of pipeline transport the flowing wealth. The Industry's various phases employ a million and a quarter persons, and its myriad derivations appear in the daily necessities of millions of homes. Truly, the paramount success and unchallenged leadership of the American Petroleum Industry in Discovery, Refining, Transportation, Research and Employment is the worlds greatest example of the *soundness* of the *free enterprise system* wherein every *citizen* is a *beneficiary!*

HUGHES
TOOL COMPANY
HOUSTON, TEXAS
WORLD STANDARD OF THE INDUSTRY

An indispensable factor in the growth of this lusty giant is the constant improvement of the famous Hughes Rock Bit. Since its invention in 1909, this outstanding engineering achievement has been a vital element in the expansion of oil discovery and production. Through vigilant research and scientific development of its products, Hughes will assist in even greater production of oil and continue to merit its distinction as "WORLD STANDARD OF THE OIL DRILLING INDUSTRY."

PRICE 50 CENTS TABLE OF CONTENTS PAGE 35 **JANUARY 6, 1949**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OF CEMENTING SUCCESS
Howco Casing Centralizers plus the Howco Roto-Wall Cleaner add up to new effectiveness in cementing. The centralizers keep pipe centered, prevent channeling of cement, provide a uniform annulus for placement of cement around pipe at critical points . . . The Roto-Wall Cleaner removes filter cake without restricting flow area of the slurry . . . Evidence of success may be seen in the photograph. Note how laminated rings of cement are formed around pipe and against wall to prevent vertical migration of fluid . . . Especially recommended where producing oil and gas zones or water zones are closely spaced . . . Ask your nearest Howco representative
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OIL WELL CEMENTING CO.
DUNCAN, OKLAHO

TN 860 O4 1949 Vol. 47 Jan/Feb

109-TON AUTOCLAVE BUILT BY BETHLEHEM

This 109-ton vessel, one of the largest all-welded autoclaves ever constructed, is 155-ft long. It has an inside diameter of 8 ft, outside diameter of 9 ft, 8 in. over the door castings, and it's designed for service at a maximum pressure of 225 psi at 650 F.

Although for use in creosoting, rather than in the oil industry, this huge vessel is offered as an example of our ability to turn out welded construction.

So next time you need construction for the transfer, storage or refining of oil, whether it's a big job or a small one, remember that we have the facilities and experience to handle your requirements in every detail, from drawing board to the completed unit.

★ BETHLEHEM STEEL ★

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

FABRICATED STEEL CONSTRUCTION

On the Pacific Coast Bethlehem products are sold by
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Industrial Construction

The smart businessman doesn't rely on guess work to avoid headaches; he consults a skilled diagnostician and prevents ills before they begin.

Brown & Root's world-wide achievements in such fields as chemical, petroleum and petro-chemical construction and design make it possible for you to draw on a virtual gold mine of experience. In related fields this experience may provide ideas for reducing capital investments and operating costs and increasing the quality of your product.

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AVOID THE LUXURY TAX

on Idle Horsepower

When your horsepower needs are small, why pay the extra cost of larger turbines, designed for much more power than you require?

You pay only for the horsepower you need when you fit the right Coppus "Blue Ribbon" Turbine to the load. They're made in six frame sizes . . . from 150 hp down to fractional . . . priced in proportion to their size.

That's why you'll see more and more Coppus turbines powering pumps, blowers, fans, stokers and other equipment requiring a steady source of small hp. *Steady* is the word for these busy little turbines. Like all Coppus "Blue Ribbon" products (blowers, ventilators, gas burners, etc.) each Coppus turbine is precision-made, with close tolerances checked by Johansson size blocks. And before shipment, the turbine you get is dynamometer-tested.

No wonder more than 85% of all orders for Coppus turbines since 1937 have been repeats . . . and that a growing number of nationally known manufacturers are installing "Blue Ribbons" on their original equipment.

Write for Bulletin 135–10. COPPUS ENGINEERING CORPORATION, 261 Park Avenue, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG and REFINERY CATALOG.

MURPHY DIESEL POWER

Rugged dependability plus operating economy

the Murphy Unit Injector

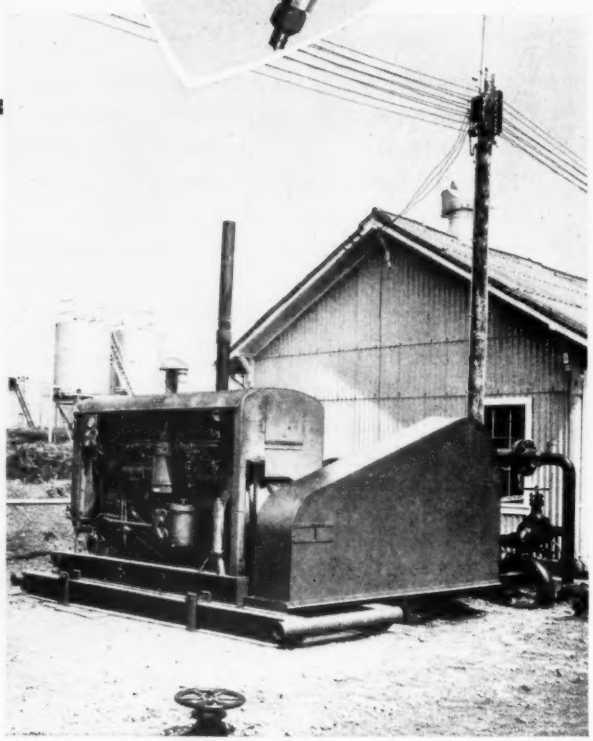
. . . heart of the MURPHY DIESEL

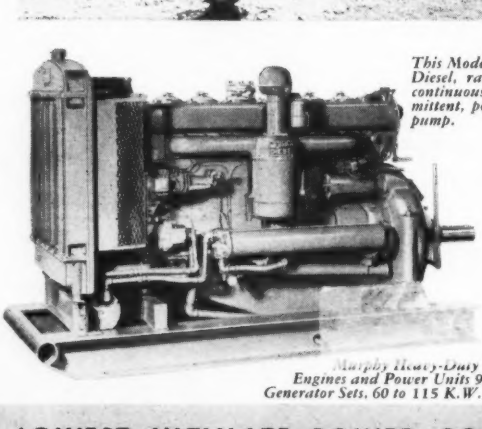
A simple, dependable unit injector for each cylinder serves as both pump and nozzle and eliminates all high pressure fuel lines.

Because it is a "true" Diesel—solid fuel injected directly into a plain open combustion chamber—the Murphy Diesel offers that highly desirable combination . . . dependable heavy-duty power *plus* operating economy. The "true" diesel operating principle in combination with such outstanding features as unit fuel injection, four valves per cylinder, dual overhead camshafts, flywheel-end cam drive and the hydraulic servo-type governor means that the Murphy Diesel is able to deliver more uninterrupted power day-in and day-out at a lower cost per horsepower.

Get full details today from your Murphy Diesel Dealer. Ask him for a copy of the booklet *"7 Questions to Ask a Diesel Engine Salesman"* or write to:

MURPHY DIESEL COMPANY
5305 West Burnham St., Milwaukee 14, Wisconsin





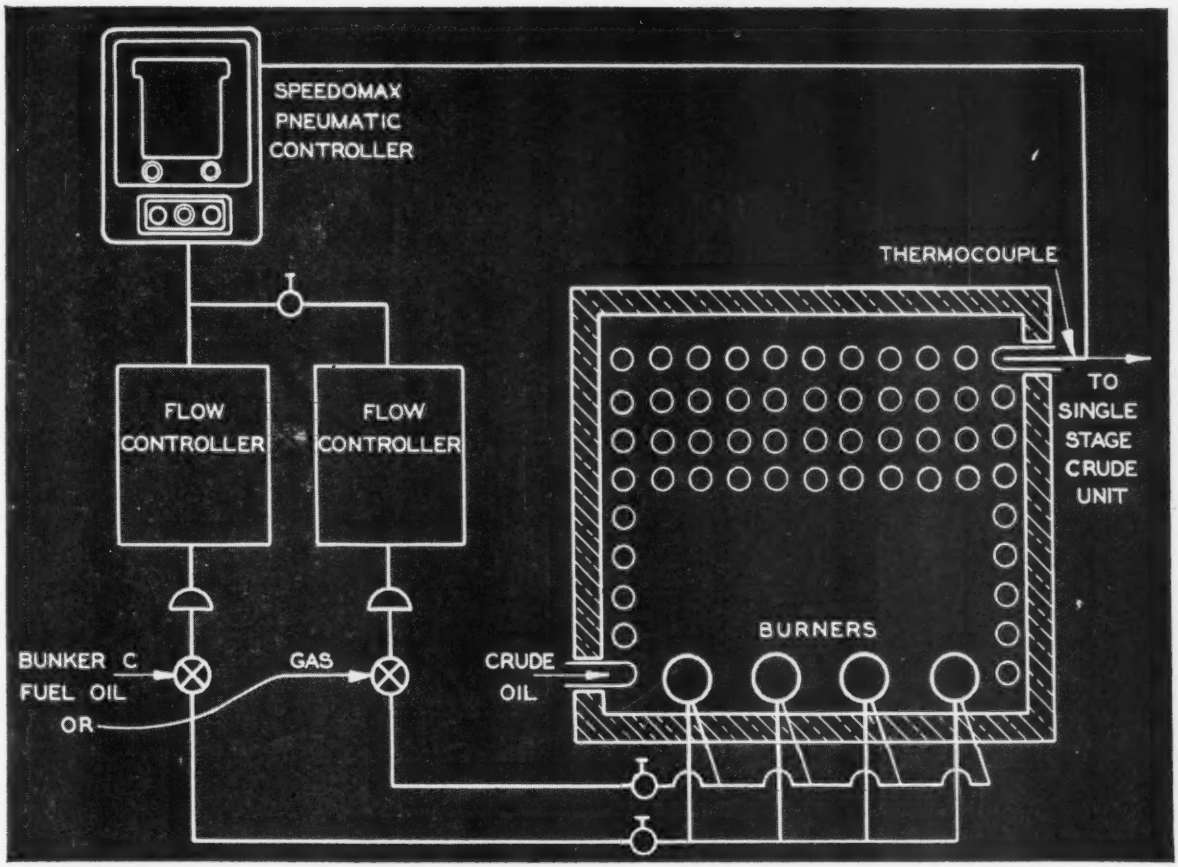
This Model ME-66 Murphy Diesel, rated at 150 H.P. continuous, 180 H.P. intermittent, powers a pipe line pump.

Murphy Heavy-Duty True Diesel Engines and Power Units 90 to 215 H.P.; Generator Sets, 60 to 115 K.W., A.C. or D.C.

MURPHY DIESEL

LOWEST ULTIMATE POWER COST

FACTORY BRANCH—SALES, PARTS and SERVICE
416 SOUTH DETROIT AVENUE, TULSA, OKLAHOMA



Charging Mixed Stocks? Firing Mixed Fuels? Get Close Regulation with L&N Complete Control

"We're thinking about shifting the Speedomax Pneumatic Controller to coil-outlet control," remarked the process engineer of a big refinery. "It has been doing a fine job on a tower-top temperature for several months. This outlet is in some ways much tougher. What do you recommend?"

"What's the trouble?" asked the L&N man.

"Well, there's a bad time lag. The stock takes several minutes to go through the furnace, from the fuel valve at the inlet to the outlet, where the thermocouple is located. Also, we burn either gas or oil—whatever fuel we have the most of, so that the fuel quality varies all over the lot."

"Another headache," he continued, "is charging stock. From day to day we charge whatever the tankers bring us. And each stock has its own characteristics, so that we must have different charging pressures and changes in furnace temperature. The whole ball of wax adds up to a real test for any temperature control."

The L&N man nodded. "Fair enough," he said. "Speedomax Pneumatic Control takes the tough jobs right in its stride. The same features of complete control that make it your best buy for your every-day control jobs will handle the toughest ones. That's the beauty of Speedomax Pneumatic—you can move it from any job to any other. You can standardize on it. Try it here and see!"

The result? A new level of efficient performance was reached. Even when charging stock changed—calling for a jump in furnace pressure and coil-outlet temperature—Speedomax brought the furnace right up to the new control point in minimum time and held it there.

For details of the complete pneumatic control which achieves these outstanding results, write for Catalog ND4B.

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

Jrl. Ad N-33A-702(66)

TRUCO DIAMOND DRILL BITS mean *Irresistible Cutting Power*

Since the advent of diamond coring in the oil fields Truco engineers have made many improvements in design and matrix to increase footage in different formations and to permit increased circulation rates to maintain good mud and hole conditions.

Truco Bits penetrate the hardest known formations and 100% core recovery is usual—a standard of performance which is beyond improvement. Truco diamond drilling products include diamond reaming shells, reamers and all necessary adjuncts to every drilling operation and emergency.

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575 Langlois Avenue
Windsor, Ont. • Canada

Truco Oil Field Products are distributed by

DRILLING SERVICE, INC., DALLAS, TEXAS

Refinery piping for every need... from one complete line

No matter how varied your needs, the complete Crane line has much to offer. **Take this Treating and Sweetening Process Piping, for example.** You can see at a glance that Crane can supply every piping item in the system—valves, fittings, accessories, pipe and fabricated piping . . . in steel, iron, brass and corrosion-resistant alloys.

To standardize on this **Single Source of Supply** is to simplify all piping procedures, from design to erection to maintenance. One order to Crane covers everything you need. Putting **Complete Responsibility** on Crane for piping equipment delivered to the job helps you to get the best possible installations, without needless delays. The **Uniform High Quality** of every item from the broad Crane line assures efficient, dependable piping performance throughout processing systems.

Crane Co., 836 S. Michigan Avenue, Chicago 5, Ill.
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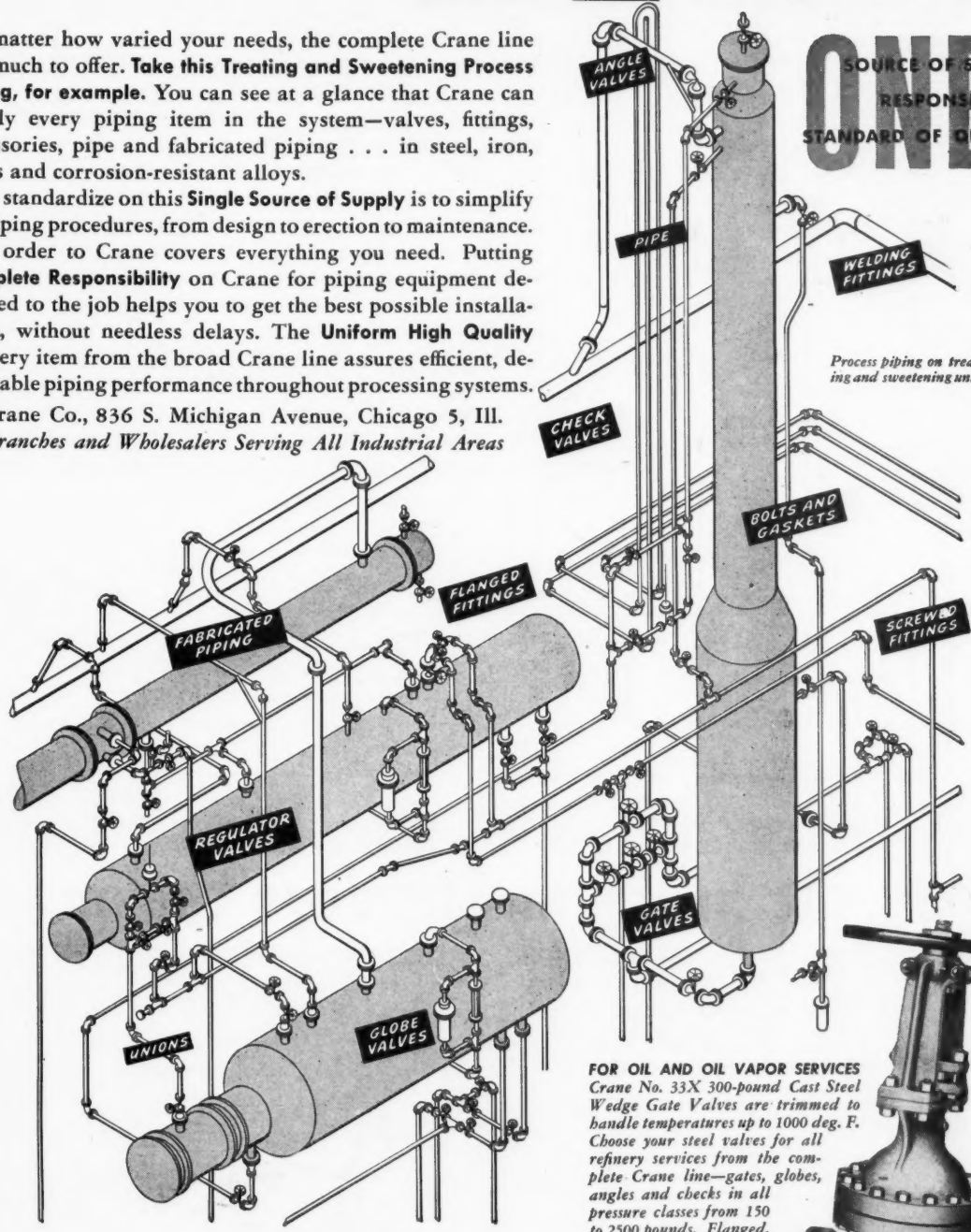
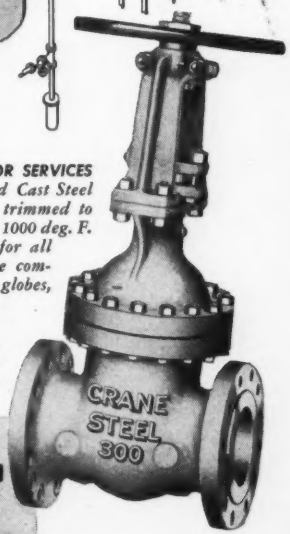
ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Process piping on treating and sweetening unit.

FOR OIL AND OIL VAPOR SERVICES
Crane No. 33X 300-pound Cast Steel Wedge Gate Valves are trimmed to handle temperatures up to 1000 deg. F. Choose your steel valves for all refinery services from the complete Crane line—gates, globes, angles and checks in all pressure classes from 150 to 2500 pounds. Flanged, screwed or welding ends. See your Crane Catalog.



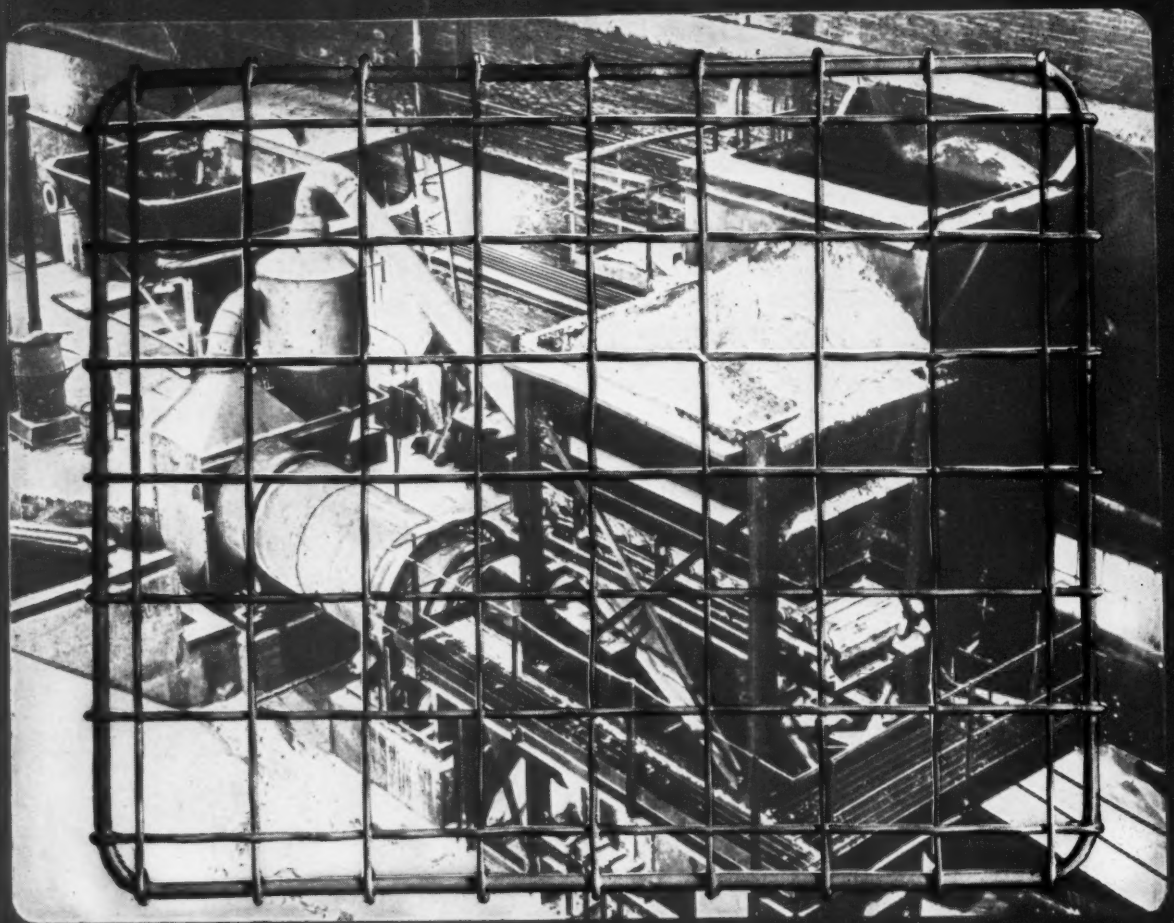
EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

TO THE OIL PLANT ENGINEER



Yours the problem - Harveys the answer!

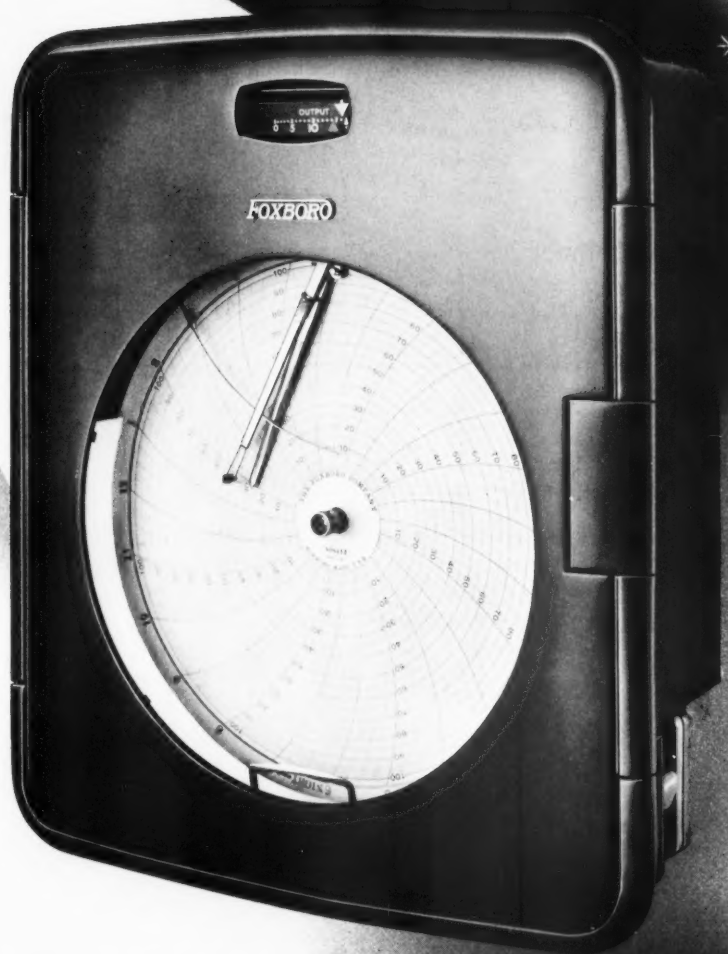
Whenever it is a question as to "where to get" wirework of any description—remember Harveys. For we make Wire Machinery and Belt Guards, Wirework Partitions, Lift Enclosures, Lattice Work, Window Guards, Baskets, in fact any form of enclosure in any metal, where wire work could be suitably used. Galvanised after manufacture for lasting protection. Send for List OG 228

Harvey

G.A. Harvey & Co. (London) Ltd. Woolwich Road, London, S.E.7

AN "EYE-OPENER" IN

Accessibility



NO GROPING for concealed adjustments! No "sweating out" of awkward alignments! No haphazard arrangement of parts to cause confusion! Everything about the Foxboro Model 40 Controller is designed for orderly accessibility as well as precision.

With the door opened, operating controls are all conveniently grouped in the upper right corner. *Instantly accessible!* Pressure reducing valve and transfer switch are equally handy. Simple removal of chart plate (no tools, no pen-removal) makes all working parts easy to reach . . . with unit construction throughout to insure automatic re-alignment, even after disassembly and reassembly.

This outstanding accessibility is only one of many advantages that result from top-to-bottom new design that makes M-40 the finest modern controller!

FOXBORO
REG. U. S. PAT. OFF.

M-40

"THE FINEST MODERN CONTROLLER"

AN "EYE-OPENER" IN CONTROL ALIGNMENT

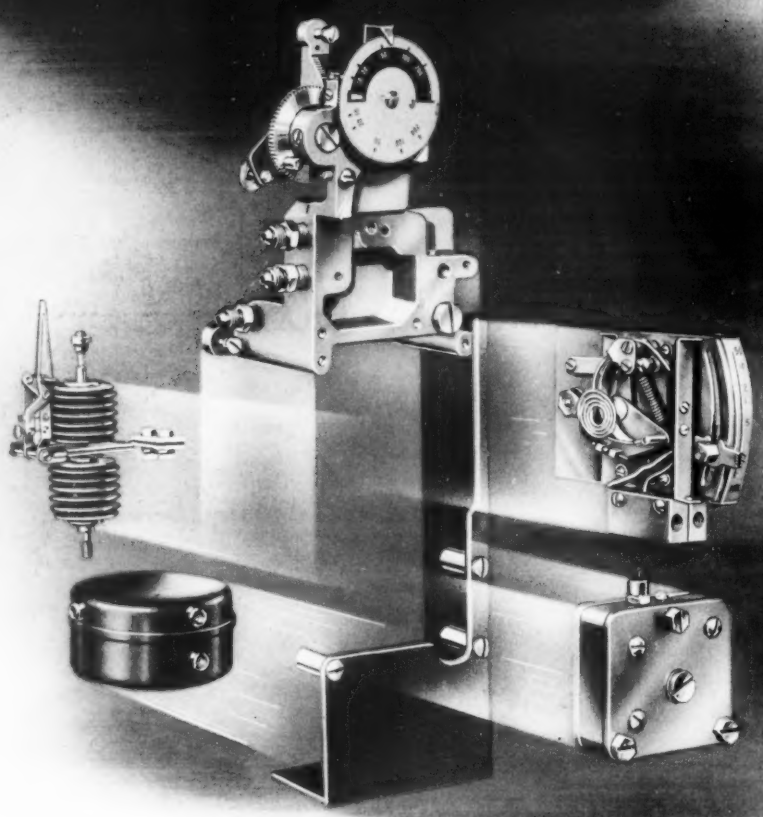
The Model 40 Pneumatic Controller is available for temperature, pressure, flow, liquid level, humidity, density, etc., in a full range of control actions and combinations. Write for Bulletin 381. **The Foxboro Company, 262 Neponset Avenue, Foxboro, Mass., U. S. A.**

The only control unit with

PERMALIGNED CONSTRUCTION

The complete Model 40 controller incorporating flapper and nozzle, control relay, hydron system and resistances is actually a series of sub-assemblies mounted on a single, solid base casting. Because of its overall unit construction, sub-assemblies as well as the entire unit may be removed or replaced easily and quickly without destroying original alignments.

Here's a typical example of the *permaligned* construction throughout the M-40 Controller . . . another important reason why instrument men recognize the M-40 as the finest modern controller.



FOXBORO
REG. U. S. PAT. OFF.

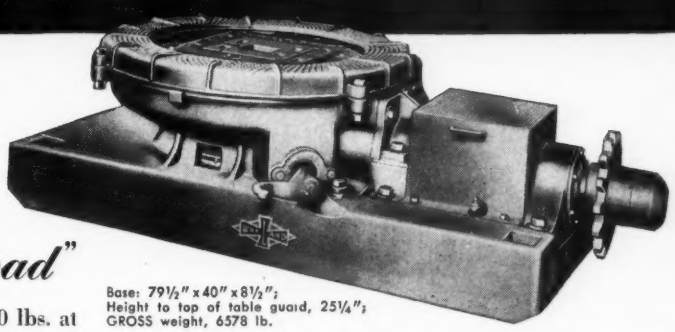
M-40

"THE FINEST MODERN CONTROLLER"

Contact KAYDON *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER

Wheland Oil Rigs' KAYDON *Bearings Carry a "Whale of a Load"*



Base: 79½" x 40" x 8½";
Height to top of table guard, 25¼";
GROSS weight, 6578 lb.

WITH a load capacity ranging from 114,000 lbs. at 250 rpm up to 234,000 lbs. at 10 rpm, Wheland High Speed Oil-Bath Rotary Drilling Rig tables pack a terrific load on their bearings. These rigs are rated for drilling 4½-inch pipe or 6⅝-inch casing to a depth of 7,000 feet... nearly a mile and a half straight down!

That's rugged work. It calls for the best of bearings. On heavy-duty equipment like this, and on machinery for steel mills, paper mills, excavators, cranes, hoists, crushers, and other big industrial units that help America's industries lead the world in production, KAYDON Bearings continue to prove they are O.K.

Counsel in confidence with KAYDON. Capacity now available for all types of KAYDON Bearings... and for atmospheric controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services.

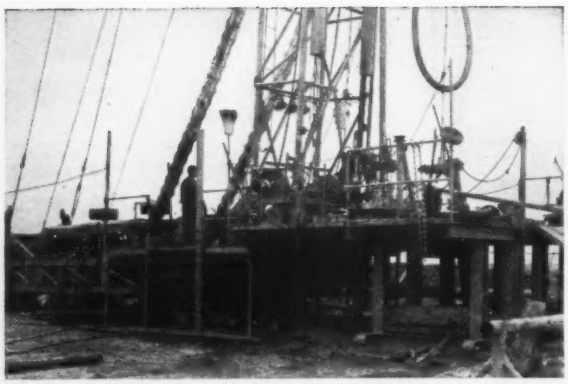
KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP.

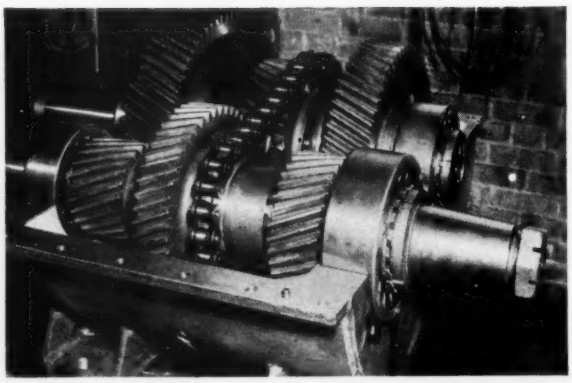
MUSKEGON • MICHIGAN

Torrington Spherical Roller Bearings

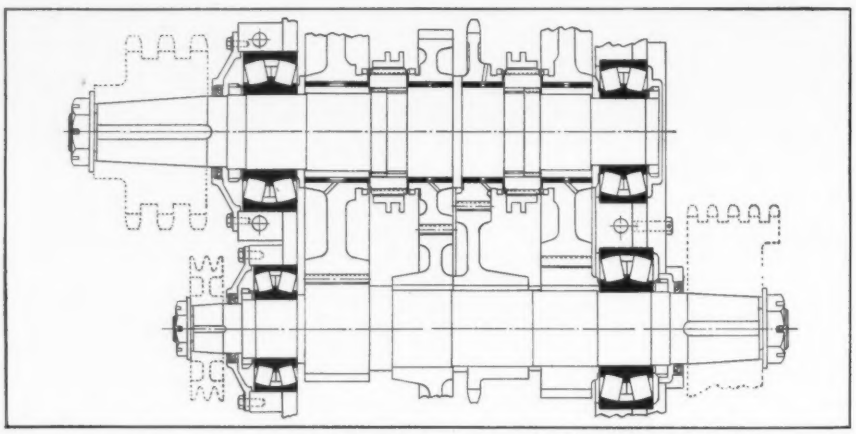
Put Horsepower in Working Harness



Heavy-duty work harness for horsepower are the four Torrington Spherical Roller Bearings in the Model 2,000 Transmission. Built by Cardwell Mfg. Co. of Wichita, Kansas, this transmission delivers 2,000 foot pounds at 1,000 rpm to operate the Cardwell Trailerig and other oil field equipment.



There are three problems in the design of transmissions . . . radial load, axial thrust of the helical gears, and maintenance of shaft alignment. In this CARDWELL Transmission, the Torrington Spherical Roller Bearings are positioned to handle all three. They compensate freely for deflection, prevent stress concentrations.



Cross-section shows the simple design incorporating Spherical Roller Bearings. The high capacity of these units means long years of service life. Interesting, too, is the use of Torrington Needle Rollers under gear and sprocket drives, affording maximum capacity in minimum space.

Power transmission is only one of many places where Torrington Spherical Roller Bearings can increase service life and reduce maintenance requirements. To help you with your friction problems, we offer our years of experience in designing, building and applying all major types of anti-friction bearings. Call or write the nearest Torrington office. THE TORRINGTON COMPANY, South Bend 21, Ind., Torrington, Conn. District offices and distributors in principal cities.

TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller · Tapered Roller · Straight Roller

Needle · Ball · Needle Rollers

The Cameron Flex-Seal Insert . . .

THIS RENEWABLE, RESILIENT FLOW-WAY INSERT SAVES 95% OF YOUR VALVE MAINTENANCE DOLLAR

When the nearest valve repair shop is miles away over water and land, you can appreciate more than ever the economy and convenience of the Cameron Flex-Seal Mud Line Valve design.

A wrench and a few spare parts in the hands of any rig worker immediately "sets you up in business" to repair your own Flex-Seal Mud Valves *right on your rig.*

By actual test, Cameron Flex-Seal Mud Line Valves require 95% less maintenance than ordinary valves and stop cocks. But when it eventually does need a new flow-way insert, or a wear ring or some other part replacement, you don't have to send the valve to a shop for repairs. Any roughneck can do the job . . . at your rig . . . with an ordinary wrench.

Designed specifically for mud line service, Cameron Flex-Seals have no delicate metal-to-metal seals to cut out under high velocity flow of abrasive fluids. Instead, the renewable resilient rubber flow-way makes a pressure tight seal and serves as a life-saver for your mud line valves.

On remote water or "townsite" land jobs, Cameron Flex-Seals can save you 95% of your valve maintenance dollar. Write for details.

CAMERON IRON WORKS, INC.
P. O. BOX 1212 **HOUSTON, TEXAS**

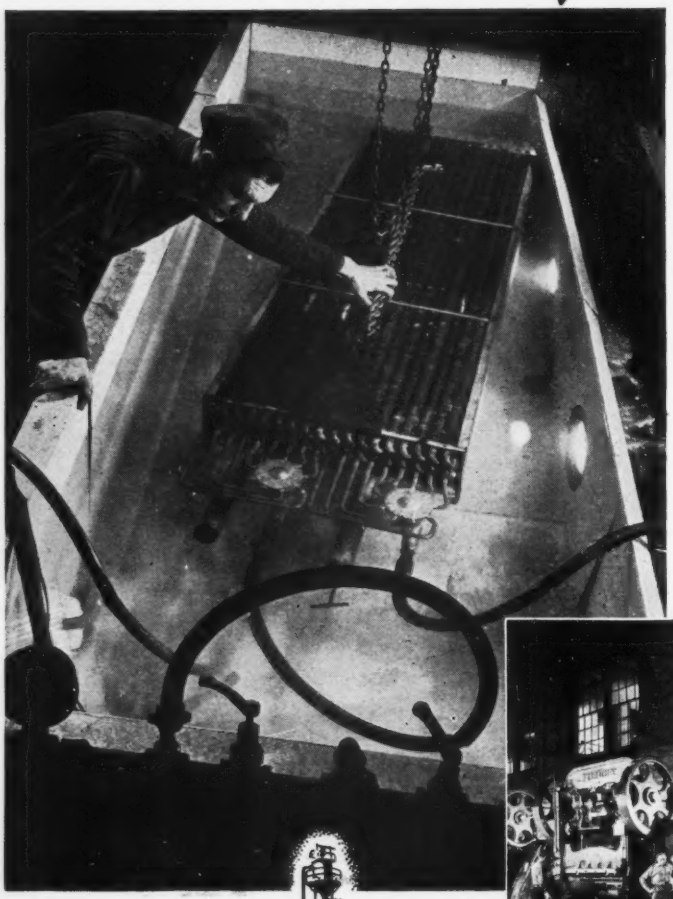
Export: 74 Trinity Place, New York, N. Y. Oklahoma: 310 Thompson Bldg., Tulsa (Telephone 28970). California: Long Beach (P. O. Box 267). Wyoming: 356 N. Wolcott St., Casper. North Louisiana: Bossier City (P. O. Box 425). Texas: Midland (Telephone 1982), Corpus Christi (Telephone 28783), Ft. Worth (Telephone 46522).

Cameron

FLEX-SEAL

The Only Valve Made Expressly For Mud Line Service

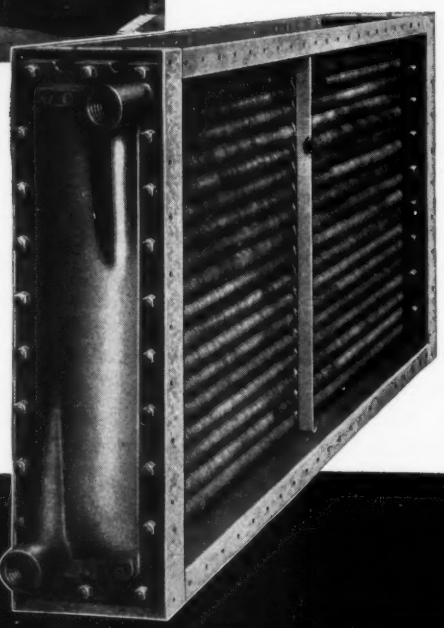
Here's the Story ON AEROFIN...



This man is completing one of the many tests used to control the quality of Aerofin finned heat-transfer surface. He is looking for air bubbles in a specially illuminated tank. If there are no bubbles, it means the immersed Aerofin unit has withstood the terrific strains of steam and hydrostatic pressure tests and is ready to give you long, efficient service.

Such rigid specifications and inspection, backed up with over 25 years of experience in manufacturing finned heat-transfer surface, assures you of Aerofin dependability, durability and maximum efficiency.

Aerofin is devoted exclusively to the production of finned heat-transfer surface. This specialization enables Aerofin engineers to select just the right surface and materials for the job, enables expert workmen to assemble these materials into a highly efficient unit.



The end result of Aerofin research, engineering and specialized production is the Aerofin Finned Heat-Transfer Unit. Day after day, thousands of units like this one demonstrate their superiority under the most severe conditions. Complete research and accurate ratings allow you to install Aerofin at full rating with confidence. You can depend on Aerofin to give you long, efficient service.

Throughout the Petroleum Industry—
Aerofin units do the job Better, Faster, Cheaper

AEROFIN CORPORATION
410 South Geddes St., Syracuse 1, N. Y.
NEW YORK CHICAGO CLEVELAND DETROIT
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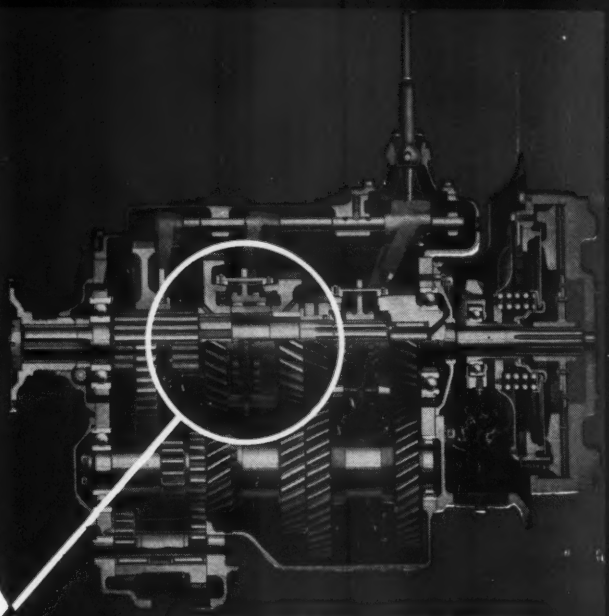
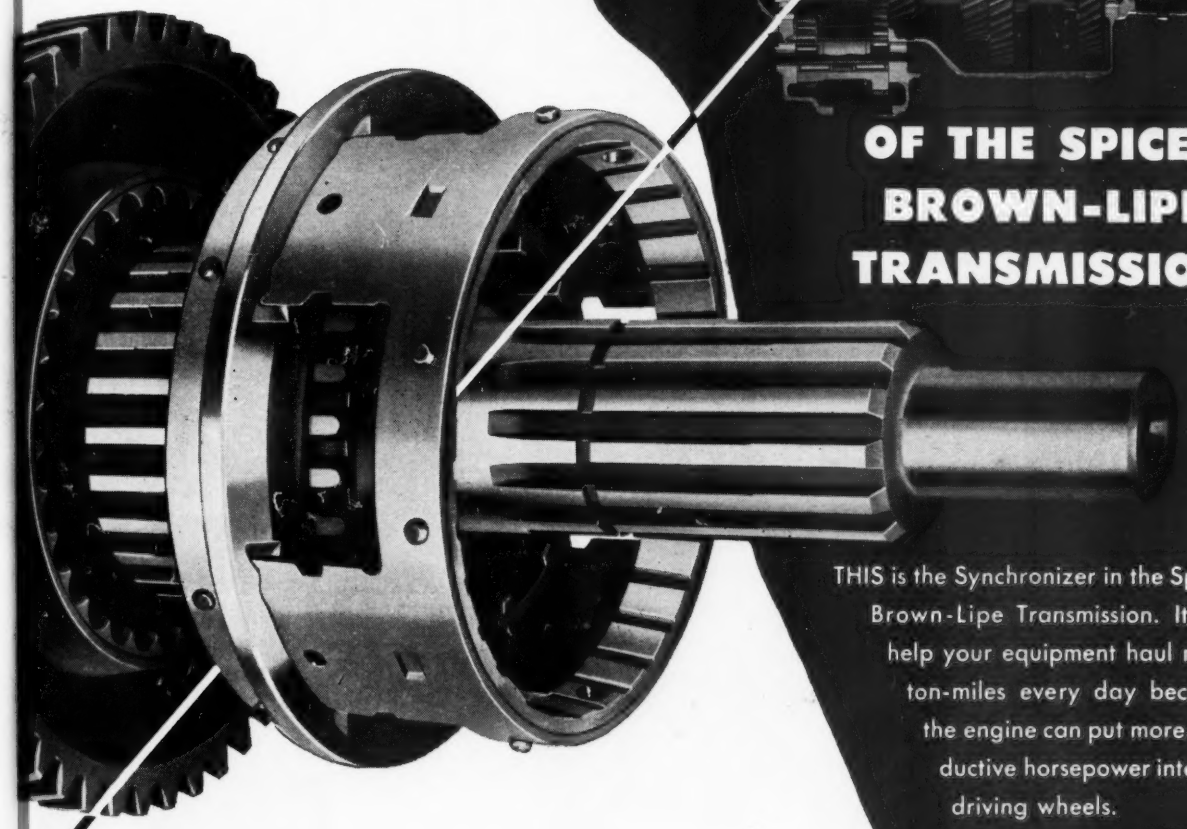
THE BRAINS



OF THE SPICER BROWN-LIPE TRANSMISSION



THIS is the Synchronizer in the Spicer Brown-Lipe Transmission. It will help your equipment haul more ton-miles every day because the engine can put more productive horsepower into the driving wheels.

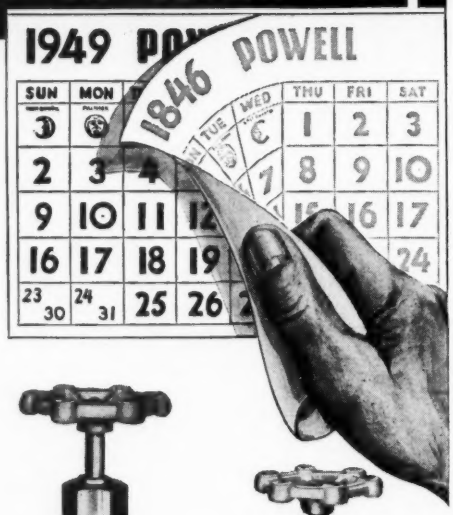
Fleet owners report major savings in maintenance.

SPICER MANUFACTURING
Division of Dana Corporation
TOLEDO 1, OHIO

TRANSMISSIONS • PASSENGER CAR AXLES
CLUTCHES • PARISH FRAMES • STAMPINGS • TORQUE CONVERTERS • UNIVERSAL JOINTS • SPICER "BROWN LIPE" GEAR BOXES • RAILWAY GENERATOR DRIVES

Designing, Developing, Engineering, Manufacturing and Service
45 YEARS OF Spicer SERVICE

POWELL VALVES start their 103rd year of service to Industry



—and the Powell record of satisfactory performance throughout all the past years is your guarantee for the future.

A century is a long time to concentrate on making valves—and nothing but valves. But it's not only important *how long* you've been doing something but also *how well.*

The fact that, in all these years, Powell has never failed to produce the *right* valves to satisfy every industrial need, is real "service."

As we start our 103rd year, there's a Powell Valve of correct design *and material* for every one of your flow control requirements. And, as new conditions bring new demands, there'll be Powell Valves to meet them.

Fig. 1793—Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", inclusive. Has outside screw rising stem, bolted flanged yoke and tapered solid wedge. Also available in All Iron for process lines.

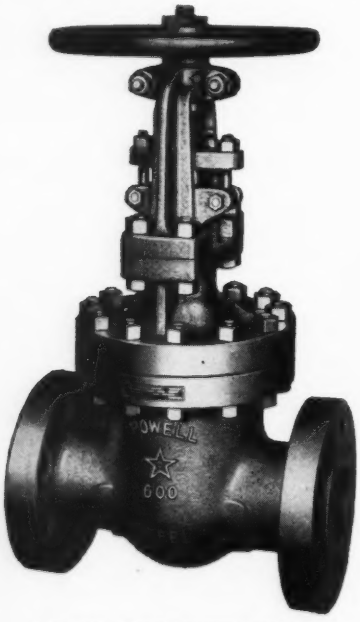


Fig. 6003—Class 600-pound Cast Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke and tapered solid wedge.

Fig. 375 — 200-pound Bronze Gate Valve. Screwed ends, union bonnet, inside screw rising stem and renewable "Powellium" wear-resisting nickel-bronze disc.

Fig. 1708 — 200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable wear-resisting "Powellium" nickel-bronze disc.

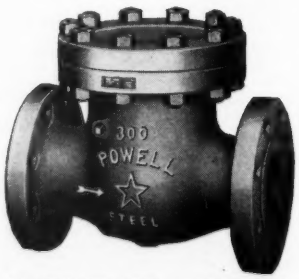
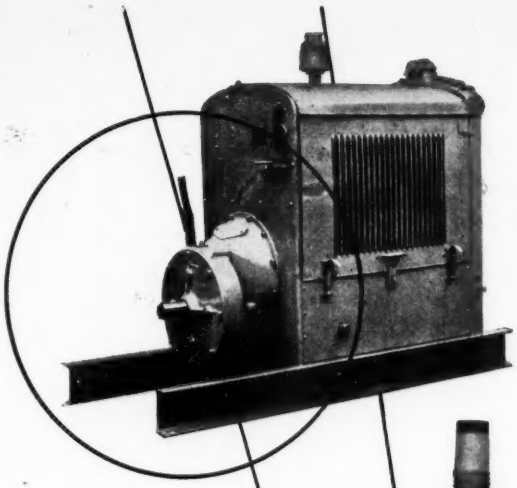


Fig. 3061—Class 300-pound Cast Steel Swing Check Valve with flanged ends and bolted flanged cap.

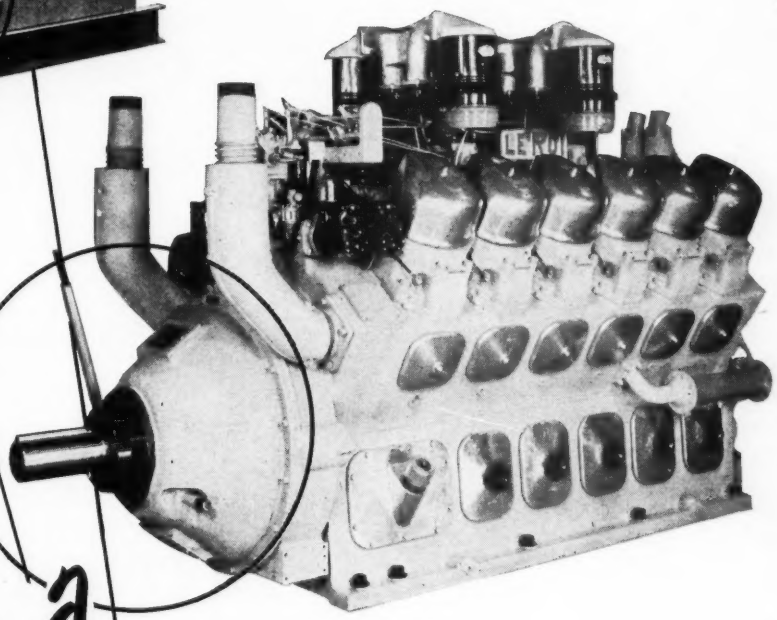
The Wm. Powell Company
Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES



Le Roi Model 2C Power Unit

Le Roi's L-3460 Engine



Twin Disc equips a revolution

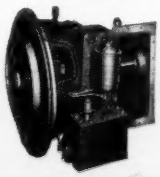
In 1919, the Le Roi Company designed a multi-cylinder gasoline engine which, it has been said, revolutionized construction equipment. The Model 2C Power Unit replaced horses and mules as power for prime moving equipment and steam or single-cylinder gasoline engines for stationary equipment. *This Le Roi Power Unit used a Twin Disc Clutch for power transmission.*

Nearly 30 years later Le Roi designed the L-3460, a V-12, 600 hp natural gas, butane, or gasoline engine for the petroleum industry. *This Le Roi Engine uses a Twin Disc Power Take-off for power transmission.*

For three decades manufacturers of heavy-duty equipment, revolutionizing American industry, have found Twin Disc Clutches and Hydraulic Drives efficient power transmission units. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

The "30th Anniversary Issue" of *Production Road* contains other records of power transmission through the years. Write for your copy.

Power Take-off



Hydraulic Torque Converter

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

Machine Tool Clutch

Heavy Duty Clutch

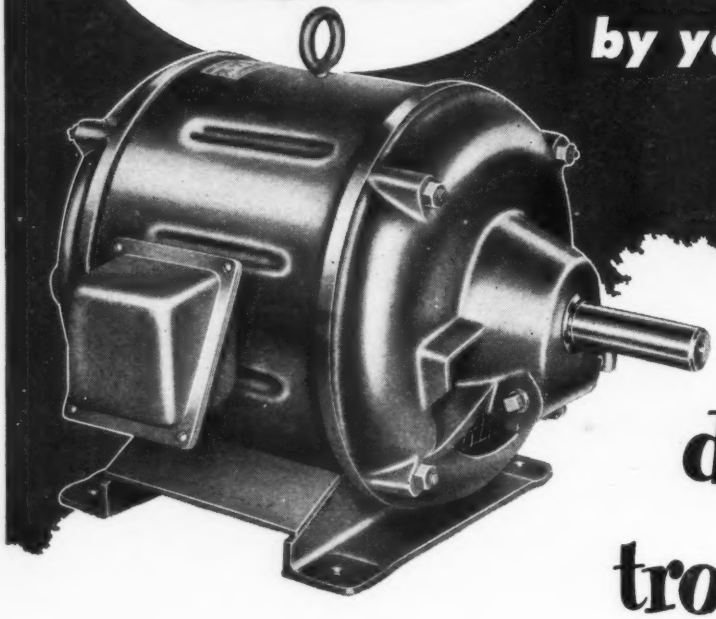
Marine Gear

JUDGE TWIN DISC BY THE COMPANIES IT KEEPS

Wagner STEEL-FRAME Motors

Proved

by years of service!



quiet... dependable... trouble-free!

Since 1930, when Wagner started manufacturing steel-frame drip-proof motors, they have been *proved*—by years of hard usage in industry after industry.

Today this time-tested design is available in polyphase motors through 326 frame size. The motor frames are formed of heavy rolled steel, shaped to accurately center the stator core and to provide passages for adequate ventilation. An auxiliary fan draws in air through the openings in the front endplate, forces it through these passages and out through the endplate openings on the drive end. Heat is effectively carried off from all parts of the motor.

These motors are available with either sleeve or ball bearings. They are completely drip-proof when mounted in the normal horizontal position, and by rotating the endplates are still drip-proof in the sidewall or ceiling horizontal positions.

Bulletins give full information on the complete line of Wagner Motors. Twenty-nine branches, located in principal cities, are ready to assist you whenever you have a motor problem. In addition, almost 500 authorized motor repair shops provide speedy, nationwide service facilities.

Wagner Electric Corporation

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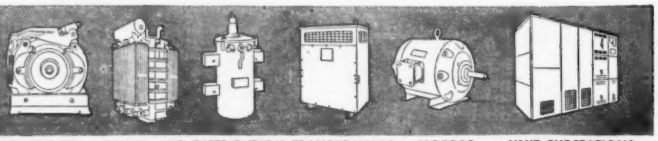
Wagner Electric Corporation EST. WE 1891

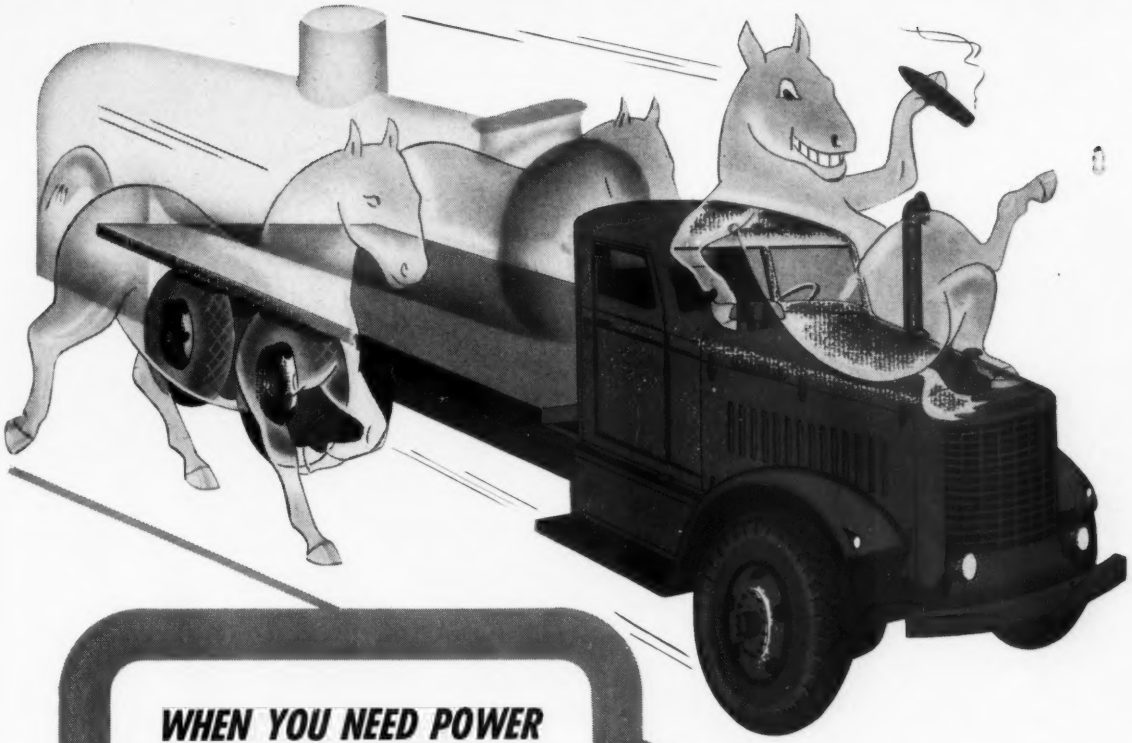
Consult Wagner Engineers on all Electric Motor Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

M49-2



WHEN YOU NEED POWER ON ALL SIX WHEELS,— BUY OSHKOSH

OSHKOSH GETS THERE *Quickly — Economically*

Mid-Continent Representatives

GARDNER PRICE CO.
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OSHKOSH
4 - and 6 WHEEL DRIVE TRUCKS FOR OIL FIELDS

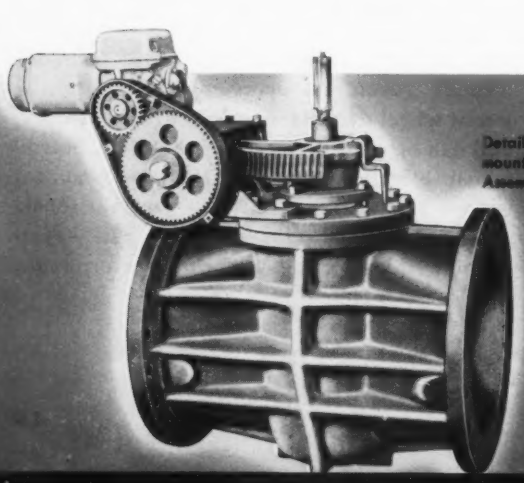
OSHKOSH MOTOR TRUCK, INC.
Oshkosh, Wisconsin

On the highway, Oshkosh trucks roll right along . . . Through "tough" terrain, Oshkosh is sure to "deliver the goods" — meaning quicker travel time — assuring that equipment is at the spot when needed, thus saving valuable time on the job.

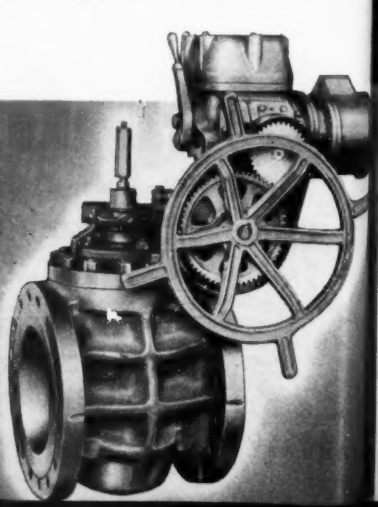
The specially designed features of Oshkosh Trucks result in economical operation — Front wheel drive is available when required, and can be cut off when not required. Sturdy construction reduces repair costs to almost zero — For example, only 1½ per cent repair time in over 13,000 hours of operation — typical of Oshkosh's championship performance.

All-electric Nordstrom valve manifold controlling lines from fields to tank at Baton Rouge, Louisiana plant of Plantation Pipeline Company. Photo by Corsini, by courtesy of Standard Oil Company of N.J.

More and more the trend is toward power-operated valves. Lubricated plug valves are best suited for motor control. Minimum time is required to open or close a Nordstrom with its quarter-turn plug. There's no chance for a Nordstrom to be "not quite" closed. Positive rotary action of the plug insures full closure and a sealed circuit of lubricant hydraulically-pressurized around each port. Our engineering staff will work closely with yours in developing the precise specifications to meet your needs.



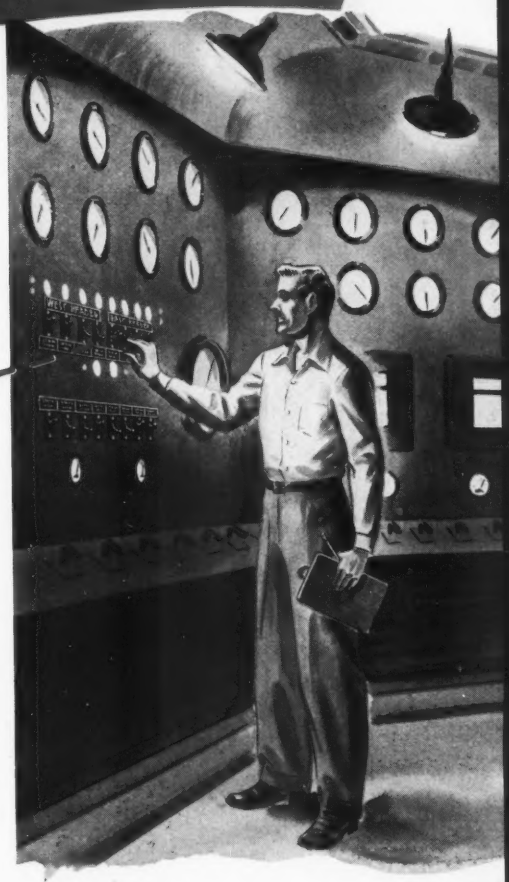
Detail of Cutler-Hammer electric motor unit mounted on Nordstrom gear-operated valve. Assembly consists of motor, reduction gears, declutching device, limit switches and contacts for controlling positions indicating lights.



Limitorque operator unit installed on Nordstrom gear-operated valve. Assembly is made at factory ready for installation on location.

Main Office

REMOTE VALVE CONTROL - most modern



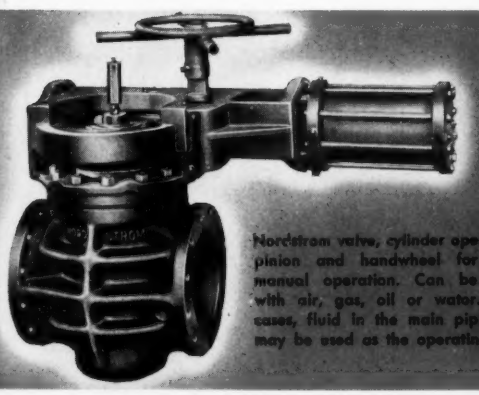
Instant, centralized control of lines

any distance ★

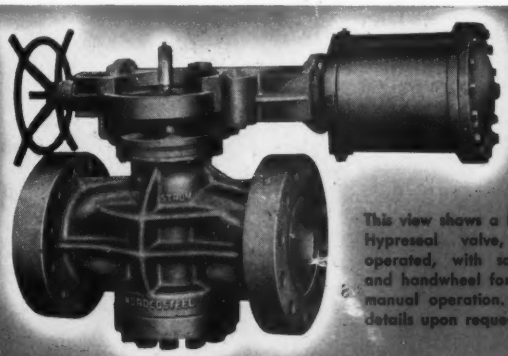
any pressure ★

any capacity ★

With Nordstrom electric motor or cylinder operated valves you can arrange control of your manifolds, pipelines and other remotely located operations independent of manual control. Standard cylinders are available for installations in which this type of control is preferable. For operating pressure ranges from 50 to 200 lb gauge pressure, complete with cylinder mounting bracket and all operative parts assembled. Nordstrom plug design gives positive closing and opening with only a quarter-turn—and the plug is permanently seated. You save man-hours and maintain instant control.



Nordstrom valve, cylinder operated, with pinion and handwheel for auxiliary manual operation. Can be operated with air, gas, oil or water. In many cases, fluid in the main piping system may be used as the operating medium.



This view shows a Nordstrom Hypreseal valve, cylinder operated, with screw stem and handwheel for auxiliary manual operation. Complete details upon request.

Nordstrom
LUBRICATED VALVES

NORDSTROM VALVE DIVISION — *Rockwell Manufacturing Company*

Main Offices: 400 North Lexington Avenue, Pittsburgh 8, Pa., Atlanta, Boston, Chicago, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa

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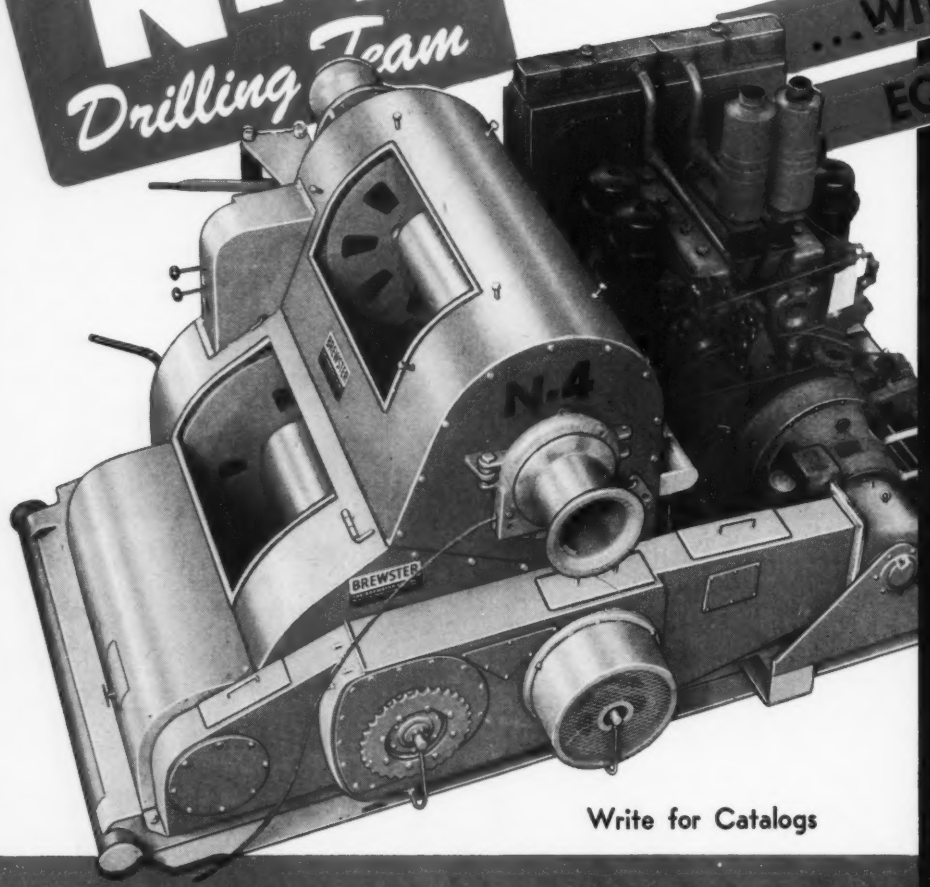
FOR ECONOMY AND EASE OF OPERATION IN DRILLING 4500'-5500'

BREWSTER N-4 Drilling Team

FEATURING THE N-4 DRAWWORKS

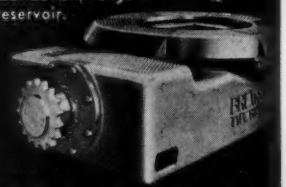
A lot of power has been packed in this easily portable rig. The Torque Converter gives it the flexibility of steam. Air Controls lend speed and safety. The hydromatic brake adds efficiency. Available in either single or double drum models with any popular power unit.



...WITH MATCHED EQUIPMENT

H-100 HOOK BLOCK
Perfectly bala for straight fal dangerous pr tions. Double tapered roller b ings on each of three sheaves. ton capacity.

4-S OILBATH SWIVEL
Streamlined for safety, with the minimum number of parts. Bearing capacity of 120 tons. Oilbath lubrication, large oil reservoir.



RS-18 OILBATH ROTARY
A heavy duty High Speed box-type rotary with a full 18" table opening. Compact integral cast bed and skid. Heat treated spiral bevel gears. Slush-proof table. Rated dead load capacity 167 tons.

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The BREWSTER CO., Inc.
Manufacturers of Drilling Equipment
Since 1910
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BREWSTER
Drilling Equipment

Thickneases from 1/64 to 1/4 inches.
Sheets 40 x 40 inches and larger.

Feeding mix for GARLOCK 7021 into sheeters at Garlock factory.

For Extreme Pressures

AND HIGH TEMPERATURES

GARLOCK 7021 Compressed Asbestos Sheet Packing was specially developed by Garlock for severe oil service. It is strong and tough, yet resilient. Gaskets cut from GARLOCK 7021 give superior service on pipe lines and other equipment handling gasoline, oil, gas or steam at extreme pressures and high temperatures.

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK
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GARLOCK 7021

COMPRESSED ASBESTOS SHEET PACKING

FOR *Big Output* ...CHECK

KOEHRING 1½ YARD *Pull Shovel*

WIDE WORK RANGE . . . digs to 54" wide, 23' below tracks . . . has 40½' digging reach.

EASY-OPERATING . . . big 37" power clutch cuts normal lever pull 90%, retains "feel".

LESS TIME OUT FOR MOVE-UPS . . . travels with turntable in any position. Separate clutch-and-brake control on each crawler.

QUICKLY CONVERTIBLE from pull shovel to shovel, dragline, or crane (30½ ton capacity).

This big Koehring 605 pull shovel has plenty of power, weight and stamina to put your cuts through in heavy rock excavation . . . plenty of range and trenching capacity for your largest lines . . . plenty of speed and dependability to give you steady, high production and completion, safely ahead of schedule.

You get rugged digging strength in every detail . . . from its heavy self-cleaning crawlers, cast, welded carbody, rigid turntable . . . to its compact upper machinery, easy-operating power clutches, rugged boom, and big 1½-cubic yard capacity dipper.

Ready convertibility to all standard excavator attachments extends the 605's big work capacity and operating economies to all your heavy jobs. Get all the facts from your local Koehring distributor TODAY. Ask him, too, about the smaller Koehring ¾-yard 304, and ½-yard 205 excavators, available on crawlers or pneumatic tires, and the big 2½-yard 1005.

KP828

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KOEHRING COMPANY
Milwaukee 10, Wis.

Subsidiaries: KWIK-MIX • JOHNSON • PARSONS

THESE HEAVY-DUTY TRENCHERS

PARSONS 200 Wheel *Trenchliner**

50 DIGGING SPEEDS . . . to 20' per minute . . . can dig mile of pipeline trench a day.

TRENCHES UP TO 5½' DEEP . . . 15 to 26" wide.

SAVES HAND TRIMMING . . . delivers clean, round-bottom trenches ready to receive pipe.

You can high-ball oil, gasoline and natural gas lines cross country at speeds up to a mile a day with this fast-digging Parsons 200 Wheel Trenchliner. And you can keep up this high-production day after day because of these Parsons heavy-duty features:

Heavy digging wheel is supported at 4 points, is firmly held at bottom, where digging pressure is greatest, by 2 double-wheel dollies. Arched wheel-frame is truss-bridge constructed, rigidly supports both digging wheel and conveyor . . . resists distortion, keeps wheel precision-aligned for accurate grading. All main operating gears are fully-enclosed, run in continuous oil bath . . . give you longer trouble-free service, cuts maintenance costs.

For complete facts on this modern pipeline Trenchliner . . . or on any of the 4 other heavy-duty ladder-type Trenchliner sizes . . . see or write your local Parsons distributor NOW.

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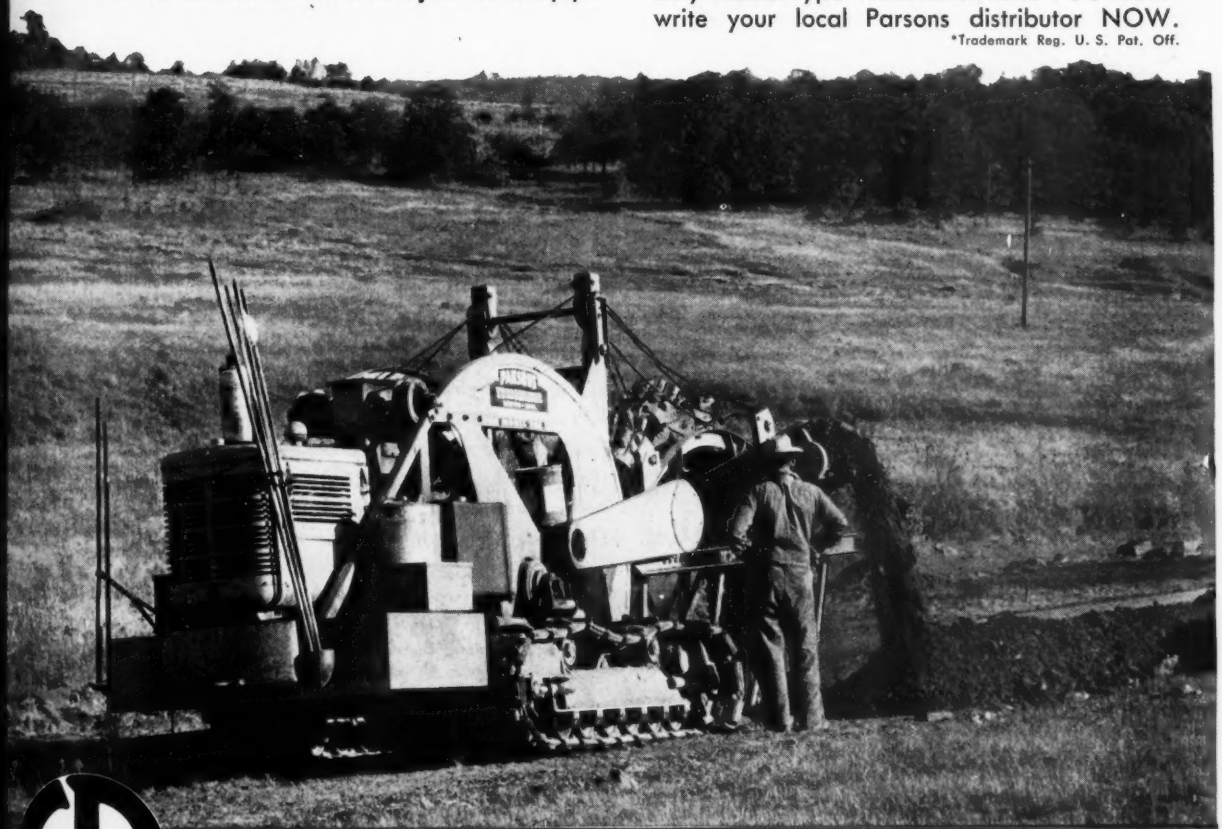

PARSONS HEAVY DUTY

The PARSONS COMPANY

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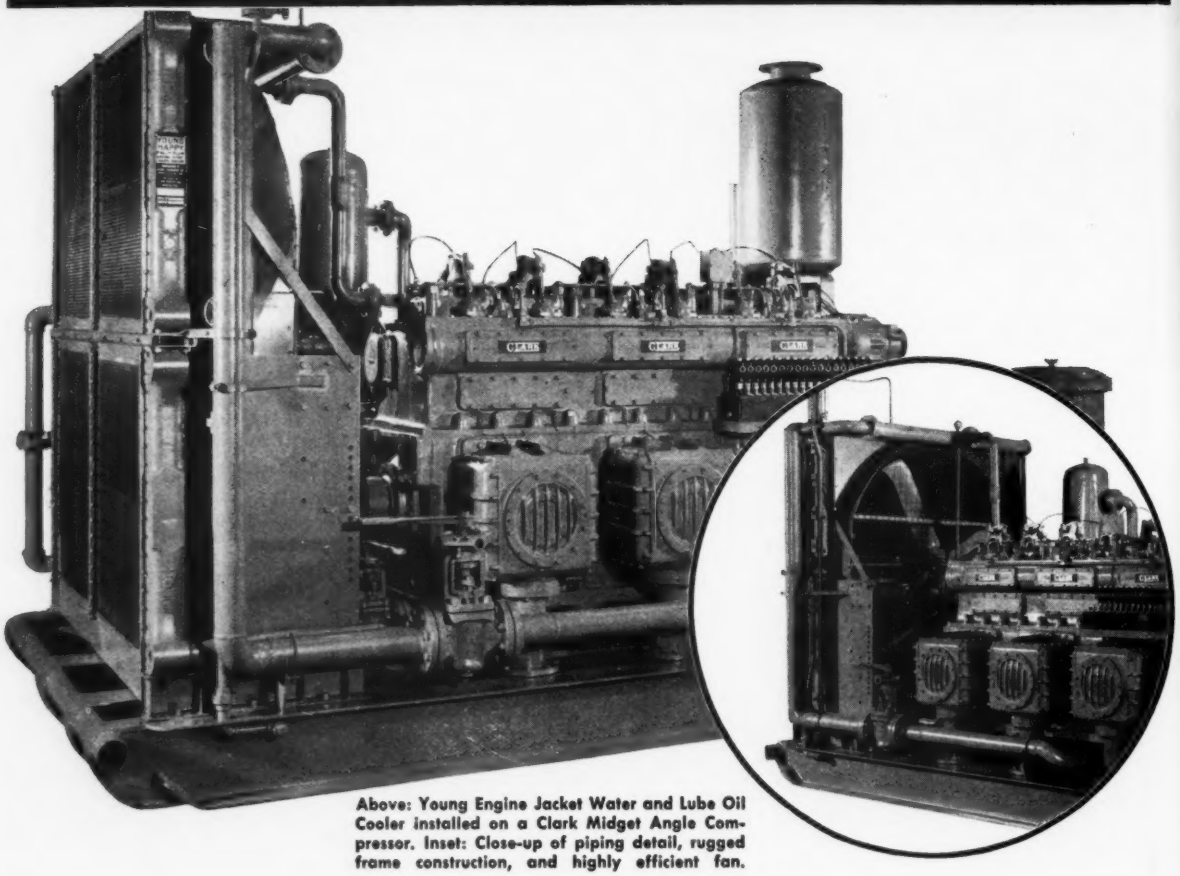
MULTIPLE COOLING FOR GAS COMPRESSORS



Above: Young Engine Jacket Water and Lube Oil Cooler installed on a Clark Midget Angle Compressor. Inset: Close-up of piping detail, rugged frame construction, and highly efficient fan.

● Portable gas compressors call for compact cooling units. Standard Young Jacket Water Coolers are the favorite heat transfer units in the field or at the refinery because they are specially developed for the equipment they serve. In addition to cooling jacket water and lube oil, Young Units are available for gas cooling between stages, making possible a complete, engineered cooling system from a single manufacturer.

Maintenance or repair service is never a problem with users of Young Oil Field Cooling Equipment. Young oil field distributors, such as The Happy Co., co-engineer in the above application for Clark Bros. Co., Inc., Olean, N. Y., are easily accessible for service and replacement parts with branches at strategic points throughout the Mid-Continent oil fields. Take advantage of the experience of more than two decades' specialization in research, engineering and manufacturing . . . use Young Quality Heat Transfer Products.

YOUNG

HEAT TRANSFER PRODUCTS

Young Quality

T.M. Reg. U. S. Pat. Off.

YOUNG RADIATOR CO.

General Offices: Dept. 209-A, Racine, Wis., U.S.A.
Plants at Racine, Wisconsin, and Mattoon, Illinois

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Wherever oil is mined — all over the world — Timken Bearing Equipped machines are at work. The Timken Tapered Roller Bearing has earned its position as the universal bearing of the oil fields by many years of dependable, enduring and economical performance in oil field equipment of every kind — from derrick top to derrick floor.

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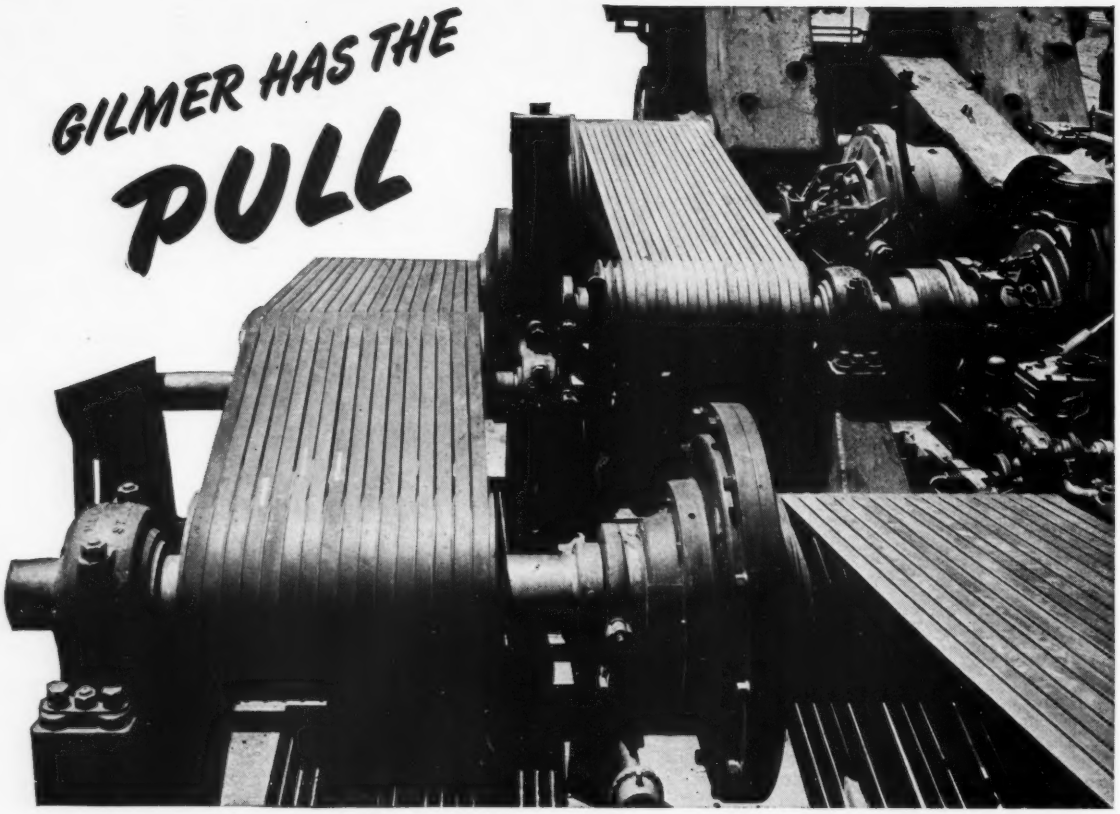
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

The Timken Bearing constantly has kept pace with progressive developments in oil production, its importance steadily increasing as the demands upon drilling and pumping equipment became more and more severe. Thus it has played a leading part in one deep-drilling record after another.

To be sure of getting maximum efficiency in friction elimination; radial, thrust and combined load capacity; and alignment preservation, look for the trade-mark "TIMKEN" on every bearing you use.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO



You can always count on *Gilmer* MULTIPLE V-BELTS for Power and Performance

Gilmer Multiple V-Belts add extra pulling power to drilling rigs, pumps, power plants and other heavy-duty applications in oil field service.

Straight side-wall construction assures a firm grip; as the belt flexes around the sheaves, sides bulge outward and hug the grooves, unlocking freely the instant pressure is released. Pulling cords are conditioned to control stretch within narrow limits. Jackets are extra tough and wear-resistant. For smooth, strong pulling power and long belt life, use Gilmer Multiple V-Belts.

Gilmer offers a complete selection of standard Multiple V-Belts, and numerous special sizes; in endless or connected types . . . also flat Standard belts—Cut Edge Belting, and the unique Kable Kord . . . "2 belts in one" . . . contactor and power.

WRITE FOR FREE copy of the Gilmer Guide. It contains valuable engineering data that will help you get maximum service from your V-Belt drives.

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GILMER ENGINEERS will be glad to help with any of your power belt problems.

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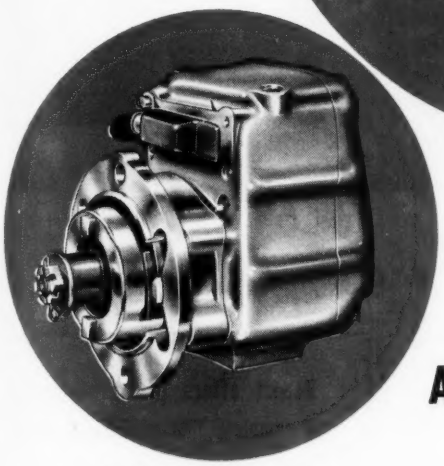
Division of United States Rubber Company

Gilmer BELTS

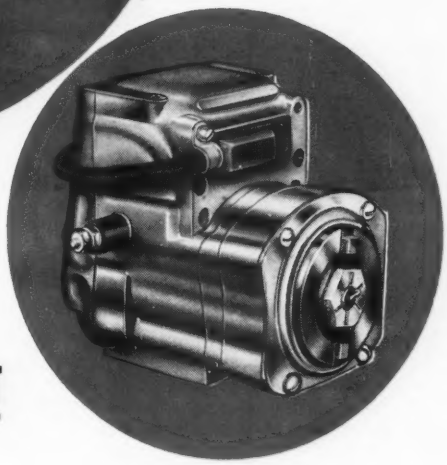
BENDIX-SCINTILLA

H-TYPE MAGNETOS



FLANGE MOUNTED

GIVE YOU ALL THAT'S BEST AND NEW



BASE MOUNTED

The new Bendix-Scintilla H-type magneto incorporates completely new design features, brings new life, new sure-fire performance to one cylinder engines. For instance, only with Bendix-Scintilla do you get the quick-starting advantages of an efficient waterproof coil. And only Bendix-Scintilla is backed by years of experience in manufacturing ignition equipment precision-built to the exacting standards of the aviation industry. As original equipment or as a replacement, order Bendix-Scintilla H-type magnetos for your one cylinder engines. For more detailed information, see your distributor or write direct to the factory.

— Outstanding Features You Have Asked For —

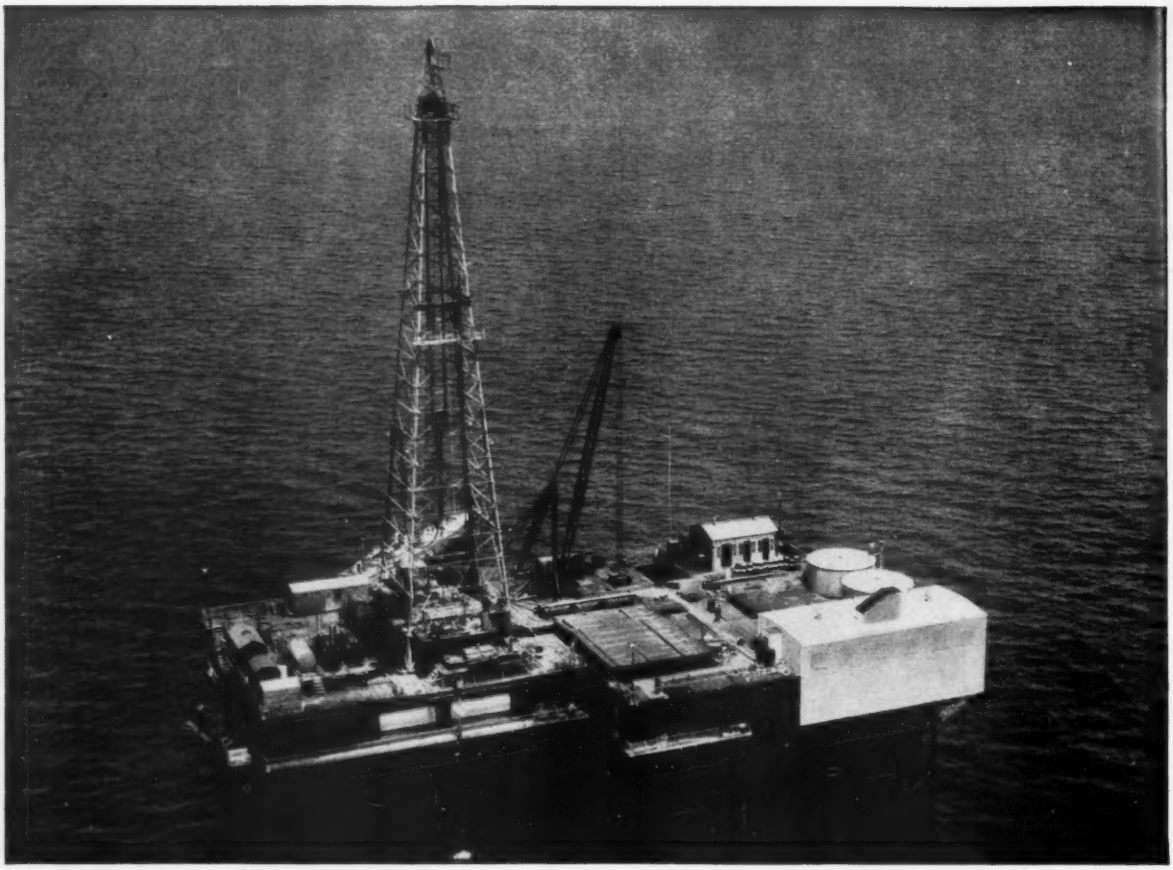
Waterproof, high-tension outlet • Higher voltage at starting speeds • Constant spark over entire speed range • Equipped with impulse coupling • Compact and sturdy construction • Waterproof coil

BENDIX SCINTILLA

SCINTILLA MAGNETO DIVISION of

SIDNEY, NEW YORK

Bendix AVIATION CORPORATION



Oil from the sea through the magic of rubber

7 types of Hewitt Hose help sustain underwater project

You're looking at a platform eight miles out in the Gulf of Mexico.

Men drill for oil there. And they use seven different kinds of Hewitt Hose!

They use oil-resistant Hewitt Hose to feed their Diesel engines. They pump washing and cleaning water through Hewitt Hose that resists pumping pressures and salt water corrosion. To "acidize" the hole, they use special Hewitt acid-resistant hose.

And in the drilling operation, of course, they use Hewitt Rotary Drilling Hose and Hewitt Oil Suction and Discharge Hose. They know these two hoses have to have peak resistance to the abuses of drilling mud and oil.

Two more kinds of Hewitt Hose supply water for cooking and dish-washing, and for drinking.

These Hewitt Hoses work 24 hours a day under constant abuse from sun and sea for the men who get *oil from the sea through the magic of rubber!*

Petroleum men have specified Hewitt Hose for years. They know they can depend on it—no matter what the job or how severe the conditions.

Whatever your hose needs may be, you can depend on Hewitt-Robins. See your distributor or write to the Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, N. Y.

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Hose for the Oil Industry

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Hewitt offers the oil industry a complete line of special hoses

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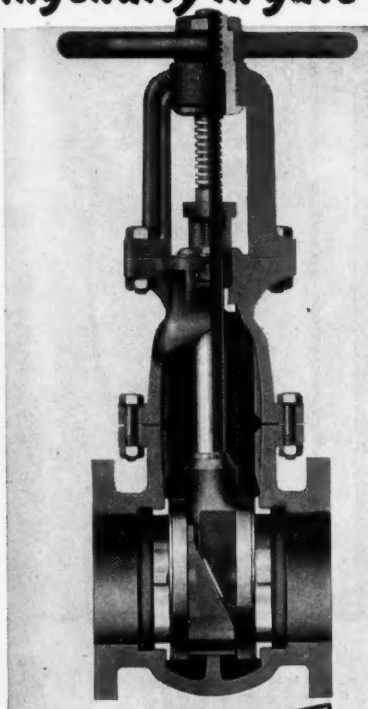
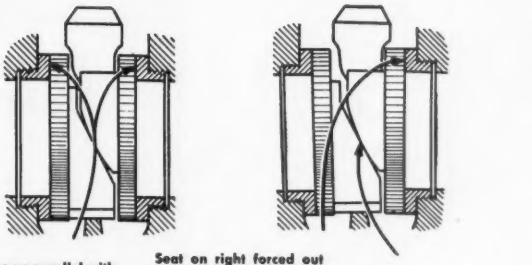


*This advertisement is one of a series showing how the unique Darling Fully Revolving Double Disc Parallel Seat Gate Valves answer the following critical operating problems:

- Positive, easy closing—regardless.
- Automatic adjustment for valve body distortion.
- Elimination of disc-to-seat friction and galling.
- Uniform wear distribution.
- Extreme simplicity.
- Greater service life.
- Simplified maintenance.

AUTOMATIC ADJUSTMENT for valve body distortion



Discs line up parallel with seats when valve is new.

Seat on right forced out of line by body distortion but disc adapts itself to give positive closing.

Curved face of wedge allows discs to adjust tightly against both seats.

ALL valves regardless of size or construction are subject to body distortion—usually a continuous, although minute, process. The causes are many, including high temperature, high pressure, and line strains due to misalignment of piping. Whatever the cause, this distortion forces valve seats out of position and ordinarily means trouble . . . leaky valves, down-time, part replacements, and costly maintenance.

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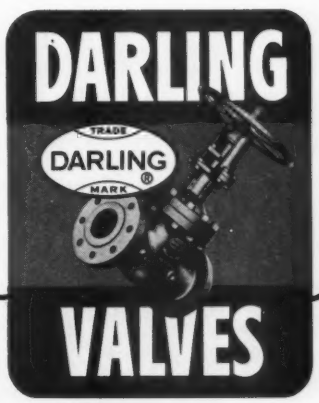

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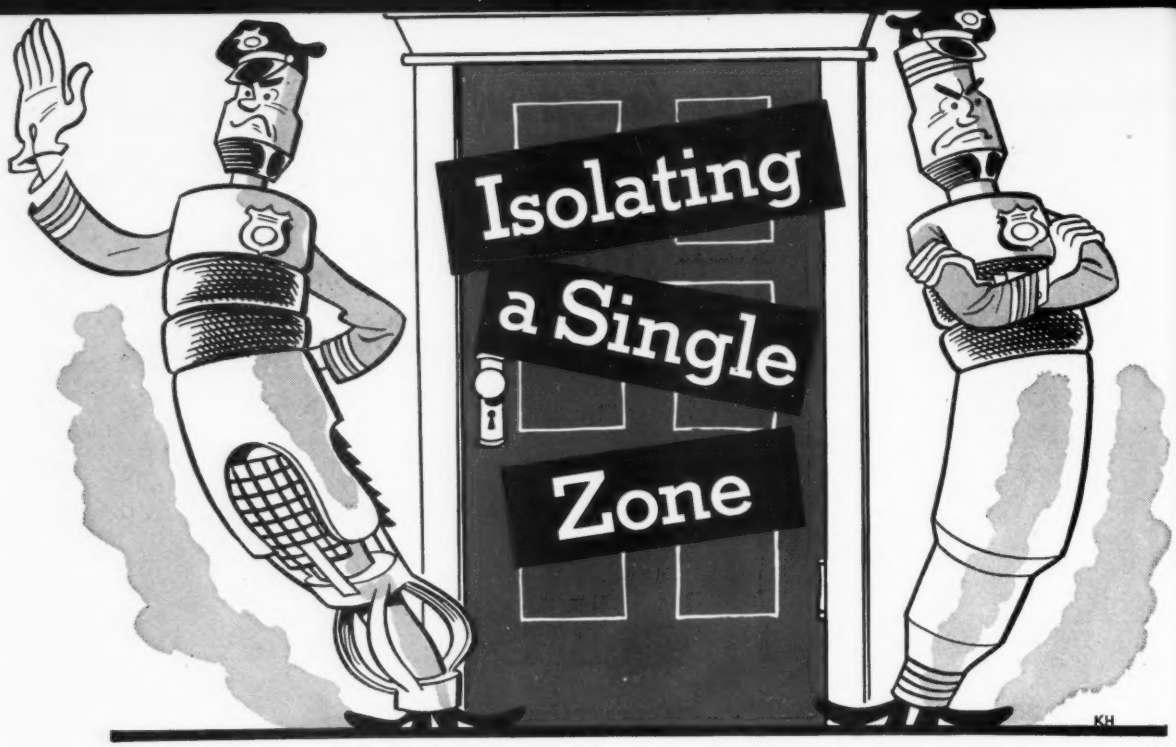

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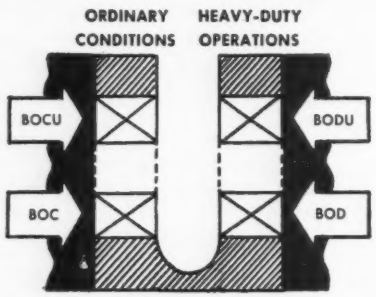

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JOURNALLY Speaking

Greetings, 1949

WELL, here we go again on another new year and the usual batch of resolutions not to do the things we resolved not to do last year but did anyway. Oh, the futility of man!

The most we could do would be to predict what is going to happen during 1949 and to give a lot of sage advice on personal and business conduct. The least we could do would be to wish everyone a happy and prosperous new year. We'll do the least.

Fill 'Er Up

WITH sadness we noted in the deaths column last week the passing of Harvey V. Wickliff, the inventor of the filling station.

It hardly seems possible that the ubiquitous filling station has not always been with us but sprang from the brain of man as recently as 1913. Before that time Wickliff, and all his fellow oil marketers, delivered petroleum products to those who wanted it, but he got the brilliant idea of staying in one spot and letting the customers come to him.

Thus laziness rather than necessity again mothered an invention, and as a result the oil industry probably outdoes all others in letting the customers come to it instead of taking the product to them.

We Predict

OUR statistical experts are unapproachable these days. They dart around with harried looks and closet themselves amid big graph sheets, piles of scribbled notes, and tangles of adding-machine tape. Their entire conversation consists of the word "annual" groaned between clenched teeth.

What they are doing is compiling the figures for the Annual Review Issue which is scheduled to be off the presses in 3 weeks, come whatever or high water.

Mindful of certain political predictions which gained considerable notice for going slightly sour a couple of months ago, the boys have polished their spectacles, sharpened their pencils to extra fine points, and placed a standing order for coffee while they check and double check. But they say they can be off a couple of percentage points in predicting the number of oil wells to be drilled and all their other startling predictions of things to come, and no harm done to their reputations, whereas the predicters in Dr. Gallup's line of work can be just as right statistically and still be utterly and dismally wrong in their conclusions.

The British Way

OF all the oil-company house organs which cross our desk we are particularly intrigued with one which has a peculiarity we don't know whether to describe as restraint, smugness, modesty, or disinclination to labor the obvious.

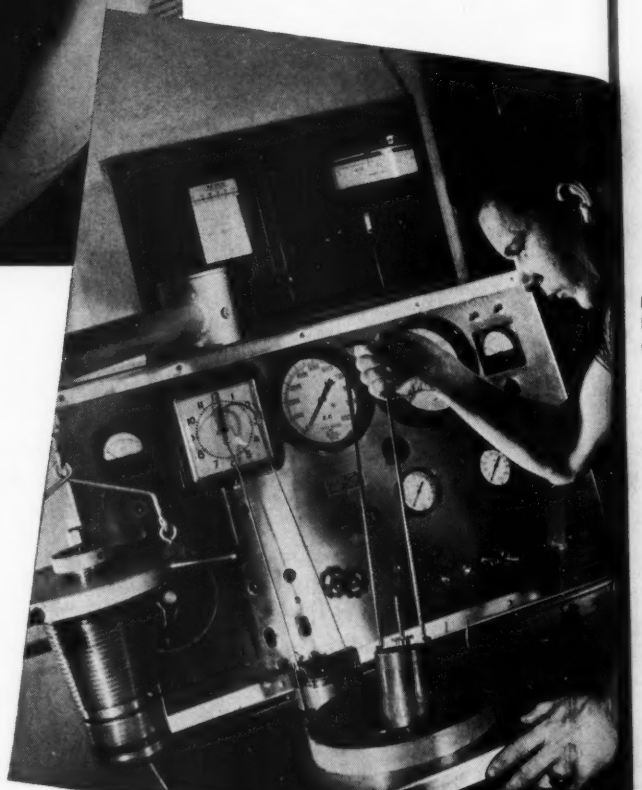
For in all 32 pages of a recent issue the name of the company appears just once, and that in the small print of the copyright notice at the bottom of the inside back cover. All the way through it speaks of "the Company," "our Company," "the Head Office," and various branches and divisions of the firm which are usually referred to by initials or abbreviations.

It is the official publication of a large oil company in England. In the Tight Little Isle it doubtless is superfluous to mention the name of a company so well known, and, besides, the employes who read the magazine know what company they work for, don't they? But we just can't imagine such self-effacement being practiced on this side of the pond by a house-organ editor steeped in the American traditions of flambuoyant advertising and repetitive impact.

Lost Art

"PEOPLE from all walks of life make a victory for good roads," says a headline in the bulletin of the National Highway Users Conference, and it was people abandoning walks that made highways necessary.

High Pressure Consistometer in Lone Star's Oil Well Cement Research Laboratory tests thickening time of cement slurries at high pressures and temperatures. Left, pouring slurry into container. Below, placing sealed cement container in pressure chamber.



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Photo, below, shows test under way, with pressure raised to about 9500 lbs. per sq. in. This apparatus recreates, with high degree of accuracy, conditions of pressure and temperature encountered in deep, hot wells.

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...in any drilling string

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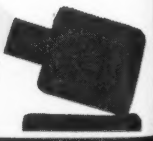

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Looking Both Ways

THE month of January, named for a two-faced mythological character, is traditionally and properly the time for taking stock of the past and peering ahead into the future. The oil industry has good reason to look both ways this month.

A year ago everyone was crying "oil shortage", and with superficial reason. Rising supply was barely keeping pace with rising demand, and some communities lacked certain petroleum products for brief periods. Many jumped to the conclusion that this condition would be chronic. More than a dozen congressional committees "investigated". Scores of people who knew nothing about oil came up with solutions—chiefly some degree of government control.

Oil men said they could produce enough oil if left alone. They weren't entirely left alone, but they did produce the oil. By mid-summer the predicted gasoline shortage had failed to materialize. By mid-autumn the supplies of heating oil in storage satisfied the most cynical. By mid-winter some prices were softening and production was leveling off. Today anyone who will examine the facts must conclude that supply has overtaken demand and that the industry has fulfilled its promise.

1948 was the year that the oil industry, without (or despite) government interference, caught up with itself, overcame the aftermath of the war, and got back into position to give full service to the public. The industry can well stick out its chest and pat itself on the back.

But it should not be like that fanciful bird that flies backward because it doesn't care where it's going but wants to see where it's been. Pride in past accomplishments is good but preparation for the future is better.

What of 1949? The newspapers this week have been full of predictions by economists, businessmen, politicians, and astrologers. You can take your pick. But the concensus is that the bloom has left the boom. Business will be good but will not come begging. Things will be more like what used to be considered normal.

For oil this means stop, look, and listen.

Demand for petroleum products will continue to increase, but at not so fast a rate. There is every indication that supply will keep abreast or ahead of requirements throughout the year. Now that the race for quantity production at any price has been won it is appropriate for each individual operator to pause and see where he fits into the 1949 picture. The outlook should not cause alarm just because it is different. But it may call for more astute managerial skill.

1949 may come to be known as the year when the oil industry shifted from shortage to surplus, from pressure of consumers to pressure of competitors, from frantic drive to prudent planning.

Louisiana Will Offer Tidelands Leases Despite Federal Suit

by Leigh S. McCaslin, Jr.

HOUSTON.—Despite the Justice Department's petition to the Supreme Court on the tidelands question, the Louisiana State Mineral Board this week decided to go ahead with its advertising of bids for a January 26 lease sale of offshore tracts.

The decision was reached after the board had heard details of the tidelands problem from state Assistant Attorney General John Madden, state Treasurer A. P. Tugwell, and board Secretary C. J. Bonnecarrere.

Tugwell told the group that Louisiana has collected and set aside an estimated $18,000,000 since June 23, 1947, from bonuses and rentals of tidelands. June 23, 1947, is the date of the California tidelands decision by the U. S. Supreme Court and the federal Government has said it will seek an accounting from the state for all money collected since that date. The $18,000,000 figure includes only money received on lands outside the 3-mile limit. Additional revenue has been received from submerged land between the low water level and the 3-mile limit.

Injunction Seen Possible

The January 26 lease sale is the result of a postponement of a sale scheduled for December 14. At that time the mineral board failed to muster a quorum and it was therefore necessary to readvertise the tracts for bids. Bonnecarrere told the board that "a number of feelers" have been received from oil operators with regard to the proposed sale. He added, however that it appeared to him that the companies are generally waiting to see what action the mineral board contemplated in view of the Justice Department action.

If the federal Government secures an injunction between now and January 26 the board will have to abandon the letting. In any case, there is some doubt that it will receive any bids in view of the legal action under way.

Bonnecarrere testified that all of the oil thus far produced from the offshore discoveries is being held in storage by the operators. Of the approximately 125,000 bbl. produced to date, Kerr-McGee Oil Industries, Inc., has 15,000 bbl. in storage at Good Hope, La. The California Co. and Humble Oil & Refining Co.—the other two concerns to find oil offshore—have the remainder of the tidelands oil in storage at Avondale, La. The three operators have sold none of the oil, and Kerr-McGee, alone, has paid the state its royalties.

Assistant Attorney General John Madden presented the board with a detailed picture of the legal angles involved in the tidelands case. As regards leasing, he said, "when the state of California was sued for its tidelands it immediately stopped further leasing, although it had not been restrained. The question must be recognized, however, that if we should stop now it might be construed as an admission on our part that we were wrong in claiming the tidelands for Louisiana."

Like California Case

In further discussion he said, "the California case and that against Louisiana are not essentially different. It is true that the enabling act whereby Louisiana acquired statehood gave the state title to all islands within 3 leagues of shore. However, we are not dealing with land here, but with water bottoms, and the crucial question is not that of who owns title to the lands, since the Government has an alternative plea of paramount rights.

"One problem that arises is what to do with money from bonuses and rentals. The state has no provision in law for holding them in escrow. The same applies to royalties from wells now producing in the Gulf. Nothing definite has arisen yet, but suppose a purchaser of oil would refuse to take it unless the proceeds could be placed in escrow pending the outcome of the Government's suit against the state? Now that Louisiana is being sued and asked for an accounting, this is likely to happen."

In the California decision, Madden related, the Supreme Court did not give the Government "paramount rights" for inland waters and bays. However, it did not define the line between tidelands and such waters. This would, he said, be a difficult problem to solve in case the Government's suit goes against Louisiana.

The mineral board members offered several opinions in discussing the January 26 lease sale. "I think we should continue leasing the lands until we are restrained," was expressed by R. B. Prentice of Houma. Edgard G. Mouton of Lafayette advised caution so as not to give the impression of defying the federal Government. He recommended that the board not adopt a formal resolution on the matter.

However, Madden replied, "one member of the congressional committee considering the tidelands bill took the Louisiana witnesses over the coals because the state had proceeded with leasing activities after the California decision was handed down. It would like something on the record to show that we are merely carrying out the policies of the official state bodies which control these matters."

The policy of the board will be covered in a resolution to be prepared by O. G. Collins, Shreveport, board chairman; A. O. King, Lake Charles; Winston L. Stokes, Bunkie; R. B. Prentice, Houma, and Madden.

States Given 2 Weeks to Object to Tidelands Suit

WASHINGTON. — Meeting for its first session of the new year, the Supreme Court on January 3 gave the states of Texas and Louisiana 2 weeks in which to file their objections to the suit brought by the Department of Justice December 21 to declare the federal Government's "paramount rights" to their tidelands oil fields.

The court did not announce whether it would entertain the department's request for permission to file an original suit, thereby bypassing the lower courts, and presumably is withholding its decision as to jurisdiction until the states' arguments have been presented. The court, however, did deal with the question of the California tidelands in a similar original suit.

As the court handed down its order, the new Congress was assembling and going through the formalities incident to organization. Bills quitclaiming any title the Government may have to the tidelands were among the first measures introduced.

Municipal Association Urges Tideland Action

HOUSTON.—Congressional action to secure title to the tidelands for the states is urged in a resolution adopted by the American Municipal Association.

The announcement, which was made by de Lesseps S. Morrison, mayor of New Orleans and president of the association, said: "The American Municipal Association, representing the officials of 9,500 cities and towns of America, believes that the states should have title to the oil tidelands, and the consolidated weight of this organization will be thrown behind our position in this matter. I have sent a copy of the resolution to members of the Louisiana congressional delegation, with the request that they all personally interest themselves in this fight."

Higher Taxes for Oil Industry Will Crimp Expansion, Seal Says

by Bertram F. Linz

WASHINGTON.—The necessity for petroleum corporations to keep dividends to stockholders at a minimum in order to secure funds for expansion is making increasingly difficult the sale of capital stock, and since there is a limit to the amount of money industry should borrow, curtailment of replacements and expansions would inevitably follow on the heels of any increase in taxes on corporations, the congressional joint committee on the economic report was advised last week by John F. Seal, vice president of Socony-Vacuum Oil Co., Inc.

Concurring in the testimony given by two representatives of the oil industry (The Oil and Gas Journal, December 23, page 32), Seal warned that the committee, which is investigating the factors underlying the present price and profits situation, should not be misled by the large profits currently being shown by corporations since, he pointed out, they must be related to costs of replacement, the universal demand for increased production, and other factors which would not prevail under normal conditions.

Seal explained that $4,000,000 of sales of goods with a current replacement cost of $3,500,000 would result in a real profit of $500,000, but if goods acquired in prior years at a cost of $2,000,000 were taken for sale there would be a book profit of $2,000,000, and the latter represents the position in which industry, generally, finds itself today. In the case of Socony-Vacuum, he said, without changing the physical quantities of inventories its dollar values have increased about $37,000,000 over the last 3 years, which has been included in the reported profits in annual statements although it is not true profit.

Inventories Are Inflated

"In the case of the inventory profits reflected in our statements," Seal said, "they could not be used for anything except to carry the inflated inventory on hand. They did not produce any more cash for us to use, but on the contrary represented cash tied up in working capital. In spite of this, present income tax laws require that taxes be paid on these inventory profits, which is in fact equivalent to a tax on capital."

Another factor to be considered, Seal continued, is that reported profits seem high because of the insufficiency of the charges for depreciation and depletion of plants and equipment. Socony-Vacuum has charged off approximately $215,000,000 during the past 3 years, he said, but has no way of telling exactly how much it would have cost to replace the exact equipment worn out or used up during that period at current prices.

"This simply means that the profits shown in our reported statements were not our real profits and that these profits must be discounted to the extent that reserves for depreciation and depletion are inadequate," Seal emphasized. "In other words, the profits created as a result of not charging off enough depreciation and depletion not only did not produce cash with which to pay dividends or use for expansion or other purposes, but actually depleted cash because of the need of paying taxes thereon. What was left from these so-called profits after taxes were paid, simply had to be tied up in new equipment or properties necessary to keep the company in the same operating condition that existed at the beginning of 1946."

Book Profits Unrealistic

Seal pointed out also that corporations now have larger sums tied up in accounts receivable, as a result of higher prices, and this larger credit requires additional cash or working capital.

"From the foregoing you will observe that one of the most important effects on our business is the fact that these unrealistic book profits made on inventories and the inadequate writeoff of plant and property are for tax purposes considered real profits and we have to pay taxes on them," he said. "When it is realized that the so-called profits for these items, which are included in our regular statements as profits, did not produce cash that we needed to run the business on, and they were taxed, which required a cash outlay, the business suffered doubly from a cash standpoint. There is no theory or accounting argument about this. We simply did not have the money in the business which the inflated earnings statements indicated, and we did have to pay out the money for the taxes imposed upon these unrealistic and inflated profits.

"It is our sincere conviction that unless the oil industry is permitted to deduct from its taxable profits amounts which will enable it to replace equipment and crude oil, it will gradually lose its purchasing power as well as its productivity."

In the case of his own company, which has paid dividends equivalent only to 3.1 per cent on investment, Seal said, it has not only been necessary to use all of the $538,000,000 cash funds available from operations during the past 3 years, but to borrow $75,000,000 and use $89,000,000 of cash on hand at the beginning of the period, to replace and acquire properties, plant, and equipment and to pay dividends and taxes.

New Reductions Posted for Some Pennsylvania Crude

Pennsylvania Grade crude oil in four districts south of the general Bradford area was reduced last week from 6 to 24 cents per barrel. Announcement was made by Joseph Seep Purchasing Agency of South Penn Oil Co. and other buyers followed suit. The new prices represent the second reduction of Pennsylvania Grade crude in the past month. On December 11 all grades were reduced 50 cents per barrel.

The new posting of $4.44 reduced by 6 cents per barrel the price of Bradford crude produced in the Tiona-Clarendon-Sheffield - Marienville area of Warren, Forest, and Elk counties. Crude produced in four counties in southwest Pennsylvania was cut 19 cents from $4.29 to $4.10. The price of Eureka grade, produced in West Virginia, was cut from $4.29 to $4.09, and the price of Buckeye grade produced in southeastern Ohio lowered 24 cents per barrel from $4.29 to $4.05.

No change was announced for Corning crude oil which stands at $3.10 per barrel. Zanesville crude also remains unchanged at $3.65 per barrel.

The Seep Agency in announcing the price changes stated that "the absorption by local refiners of increased pipe-line charges and active bidding for crude supply have resulted in overpricing grades of crude when those grades must be delivered to other refining areas in a competitive market."

Kansas January Allowable Set at 295,000 Bbl. Daily

A reduction of 5,000 bbl. per day was approved by the Kansas Corporation Commission in setting the state's January allowable at 295,000 bbl. daily. The commission halved a cutback recommended by T. A. Morgan, state conservation director. He suggested a return to the 290,000 bbl. daily level maintained for most of last year.

Scarcity of Cement for Oil Uses Expected to Last Through 1949

by Leigh S. McCaslin, Jr.

HOUSTON.—Cement for the oil industry will continue to be in short supply during 1949.

This is the conclusion which can be reached by talking to those in a position to know—the cement manufacturers, cementing companies, and oil-company production departments.

During the winter months there has been some easing of the situation, which is attributed to retarded construction programs in the northern states. Also, the shortage has been over in California for several months and may not recur. Despite these hopeful signs, it is predicted that 1949 will be another "tight" year.

A number of factors are responsible for this expected shortage. In the first place, it is widely predicted that the oil industry's drilling program will expand this coming year. This is in spite of the fact that it is already at record heights. Consumption of cement outside of the oil industry is reaching new highs. The construction industry is always a major consumer, but is booming at present. Farmers have developed into a new market because of a prosperous agricultural economy—pig sties, barn floors, and silos are taking a surprising amount of cement. Still another contributing factor is that exports of cement are well above prewar levels.

The 1949 shortage is not expected to curtail oil-industry drilling activity. It will mean only that, in some cases, the industry is going to pay high, even exorbitant, prices for the product.

Past Year Difficult

During this past year, the shortage was felt in many ways and in many places. It is reliably reported that some drilling wells in West Texas were forced to circulate up to 48 hours waiting on a supply of cement. One major cementer was out of cement for an entire week in Kansas—a leading oil state.

In order to get cement, some producers took drastic steps. In the Mid-Continent area, one major oil company had to ship cement into the state from California, despite the fact that there were cement mills within 300 miles of the oil field. The cement mills in this particular state, in fact, mill six times as much as the state's normal consumption. In buying it from California the company was forced to pay $1.20 per sack freight on cement which is worth only 55 cents per sack.

In West Texas truckers brought in "gray market" cement from everywhere and charged as much as the trade would bear. Reports indicate that the price went as high as $3 per sack in such operations as contrasted with the normal mill price in West Texas of 60 cents a sack.

Some reports were heard that cement was sold for as high as $5 a sack in the Rocky Mountain oil country. An agent of a Belgian cement manufacturer visited the Houston area and took orders for large quantities of cement. His price was $22.30 a metric ton on the boat in Houston —which equals 95 cents per sack.

Some cement is being procured from Mexico for the Gulf Coast area. The mill price in Mexico is the same as for the States, but the freight to get it to the area brings the price up considerably. In addition, it has to be handled twice after arriving by rail from Mexico. Agents from as far distant as Poland have offered cement to Gulf Coast users.

Industry Needs High

The oil industry is a major consumer of cement although not on a par with the construction industry or farmers. No exact figures are available, but it is estimated that the oil industry uses 5 per cent of the nation's output. Oil well cementing alone requires approximately 6,000,000 bbl. (24,000,000 sacks) annually. To this must be added the quantities used for such things as refineries, gasoline plants, and pump settings.

As far as oil-well cementing is concerned, the trend has been toward increased amounts per well. For one thing, more deep wells requiring more cement are being drilled. In addition, the newly-developed caliper surveying technique has shown that drill holes are larger, in many cases, than previously believed. This, of course, results in larger amounts of cement being required to set pipe.

With no squeezing, a representative Mid-Continent well will require about 1 car (1,600 sacks) of cement. In West Texas this figure increases to 1½ cars or 2,400 sacks. Some wells in West Texas take as much as 12,000 sacks of cement for a cementing job.

The over-all picture of cement supply is affected considerably by the Supreme Court decision this past year which outlawed the basing-point price system formerly used by the cement industry. Under this system the manufacturer absorbed freight costs and these were included in the price of the cement. Now, cement is quoted at the mill and the purchaser is required to pay the freight to the point of use.

The major result is that manufacturers are concentrating on building up steady customers in their immediate trade areas. Also, they are reluctant to build new plants until they see if the Supreme Court decision is going to stick. If it does, new plants might be built in areas where the demand is greatest rather than the points most suitable from a manufacturing standpoint.

One mixed blessing of the outlawing of the basing-point system is the fact that it is easier perhaps to get cement from distant points. Using basing-points, the mills lost money shipping cement long distances. Now, with the consumer paying the freight, this is no longer a factor with them. If the consumer wants it badly enough to pay the freight he can get it, assuming, of course, that the mill has it.

Output at Record Level

Production of cement is expected to reach an all-time high this coming year—in excess of 200,000,000 bbl. The 1947 production was the previous peak with 184,658,000 bbl., which was only slightly larger than the previous high years of 1942 and 1928.

This increase has not been accomplished by large increases in plant facilities, but rather by operating at a higher percentage of listed capacity. Cement manufacturers say they have not increased facilities rapidly for two primary reasons: the steel shortage and the belief that the current situation is abnormal and hence it would be uneconomic to build new plants.

Some additional cement-production capacity is coming. One estimate is that 5,000,000 bbl. of capacity will be available by the end of 1949. A good part of this (around 1,200,000 bbl.) will be provided by a plant being built at Corpus Christi by Erle P. Halliburton. Although Halliburton is the founder of the cement company bearing his name he no longer has controlling financial interest, so his plant will not necessarily supply the oil industry.

In Houston, Gulf Portland Cement Co. is putting new facilities in operation, increasing production 40 per cent, and Trinity Portland Cement Co. has under way a program to increase its output about 25 per cent.

No cure-all solutions have been offered for the cement shortage. Some oil-field users have expressed the opinion that the cement industry should police its dealers. They feel that all cement is not going into fair trade channels, but to speculators.

Oil-field users complain about not being able to get firm commitments from the mills on future delivery. Some complaints are heard that government construction projects are taking huge quantities of cement.

this week

GOVERNMENT—Texas and Louisiana get 2 weeks to object to federal suit in Supreme Court seeking jurisdiction over their tidelands. . . . Louisiana will ignore suit by offering offshore oil lands for lease. . . . ¶Socony-Vacuum official tells congressional committee higher corporation taxes would curtail needed expansion of the oil industry. . . . ¶Oil men on survey committee report excessive secrecy prevents industry from experimenting with commercial uses of atomic energy. . . . ¶FPC denies charges its rate regulation is responsible for high debt ratio of natural-gas companies. . . .

SUPPLIES—Cement for oil uses will continue short. . . . Output is high but so is consumption. . . . Elimination of basing-point price system changes distribution pattern. . . . ¶Sales of liquefied petroleum gas rose nearly 30 per cent last year. . . . Market still expanding rapidly in all divisions, but industry now able to meet all L.P.G. demands. . . .

INTERNATIONAL—Congressional committee recommends large loans to Pemex for petroleum projects. . . . Wants these contingent upon reentry of private oil capital to Mexico. . . . Report reveals new Mexican proposal made to U. S. oil companies. . . . ¶New pipe line in Iran, ready in April, will permit export of additional 100,000 bbl. of crude daily. . . . ¶Pantepec reports its Venezuelan concessions highly productive. . . . Discovery of deep zone in El Roble most important development. . . .

TRENDS—Preliminary Journal figures show U. S. crude-oil production passed the 2-billion-barrel mark for 1948, the highest in history. . . . Crude oil and condensate production reached about 2,030,000,000 bbl. for the year. . . . ¶Total wells drilled will number approximately 39,200 for 1948 as compared to 33,100 for previous year. . . . ¶For week ended December 25 residual stocks show first decline of the season. . . . Four major products drop 1,811,000 bbl. . . . For 3 weeks ended December 25 combined crude oil and products stocks were up 220,000 bbl. daily. . . . ¶Products market in most areas remains generally slow. . . . Price weakening noted for some material. . . . Unseasonal weather continues. . . .

PIPE LINES—Atlantic Pipe Line Co. begins its 382-mile, 10-in. crude-oil line from West Texas to Gulf Coast area. . . . ¶WAA seeks bids for 100-mile natural-gas system in Lake Charles, La., area. . . . ¶Crude-oil line from Boscan field to west shore of Lake Maracaibo, Venezuela, is completed by Richmond Exploration Co. . . . ¶Michigan Gas Storage Co. awards 75-mile contract for Michigan line. . . . Pipe laying to begin next month. . . . ¶Humble considers new 370-mile, 16 or 18-in. line from West Texas to Baytown, Tex. . . . ¶Texas Gas Transmission has 237 miles of 26-in. pipe stored along projected route of its 840-mile Texas-Ohio pipe line. . . . ¶Stanolind Pipe Line Co. establishes new offices in Lubbock, Tex., to direct West Texas operations. . . .

REFINING—Standard Oil Co. of California and subsidiaries consolidate western asphalt business. . . . Stancal Asphalt & Bitumuls Co., formerly known as California Asphalt Corp., is the new organization. . . . ¶Government's purchasing agency recommends government vehicles change oil every 4,000 miles. . . . ¶Bureau of Mines lists shale-oil patents. . . . Most patents held by petroleum refiners. . . . ¶McColl-Frontenac Oil Co., Ltd., plans construction of refinery at Edmonton, Alta. . . .

Shore base at Sabine, Tex., just completed by Stanolind Oil & Gas Co. to service offshore wells in the Gulf of Mexico. The 20-acre site includes loading docks, mooring places for crew boats, fuel tanks, offices, a warehouse, and a 300-ft. radio tower through which the base keeps in touch with drilling platforms and company boats. Shown in slip is a converted LST equipped to service drilling platforms

Liquefied Petroleum Gas Sales Rose 29.5 Per Cent in 1948, Survey Shows

by K. W. Rugh and E. O. Mattocks

A typical L.P.G. metered-service installation used in domestic consumption

Outstanding features of the liquefied-petroleum-gas industry during 1948, as shown in this annual survey, include:

1. Sales increased 29.5 per cent over 1947, and the increase during the year is equal to the total marketed in 1942.

2. Use of L.P.G. for domestic purposes increased 33.9 per cent during 1948, the increase being equal to the total marketed for domestic purposes in 1946.

3. Twenty-five per cent of all gas ranges manufactured in 1948 were designed to use L.P.G.; 5,500,000 homes now use L.P.G., one-third of them for space heating.

4. Industrial plants of many types are using L.P.G. as a standby fuel in increasing numbers.

5. The use of L.P.G. by manufactured-gas plants, both for standby purposes and as a raw material, increased 65 per cent during 1948.

6. L.P.G. promises to become increasingly important as a source of raw material for chemical manufacture.

7. Transportation facilities are now adequate to handle the volume of business and the liquefied-petroleum-gas industry is in position to meet further increases in demand.

DURING 1948 the liquefied petroleum gas industry continued the steady growth which it has shown consistently during the past decade. In spite of various obstacles placed in its path the rate of growth has been reasonably uniform.

It is estimated that during 1948 the total volume of liquefied petroleum gas marketed reached a total of 2,600,000,000 gal. This represents a 29.5 per cent increase over the volume sold in 1947. The increase in 1948 in marketed L.P.G. over that marketed in 1947 was greater than the total quantity of liquefied petroleum gas marketed during 1942. The 1948 volume is equal to 24 per cent of the total L.P.G. marketed since 1930.

The estimated volume of L.P.G. sold for domestic purposes in 1948 is 1,540,000,000 gal. This represents an increase of 33.9 per cent over that consumed for the same purpose in 1947. The total quantity consumed for domestic purposes in 1948 is greater than the total quantity of L.P.G. sold for all purposes in 1946, just 2 years prior. The large demand for this product for homes, farms, institutions and commercial establishments located beyond the gas mains is clearly indicated.

The domestic requirement is made up of two different demands. The first results from new consumers added during the year who previously have used other types of fuel or whose fuel requirements represent an entirely new demand, such as for a new home. The other demand results from the increased usage by consumers who have had L.P.G. installed for some time.

It is estimated that better than 25 per cent of the gas ranges produced in 1948 went into the L.P.G. market. The demand for L.P.G. automatic water heaters and refrigerators con-

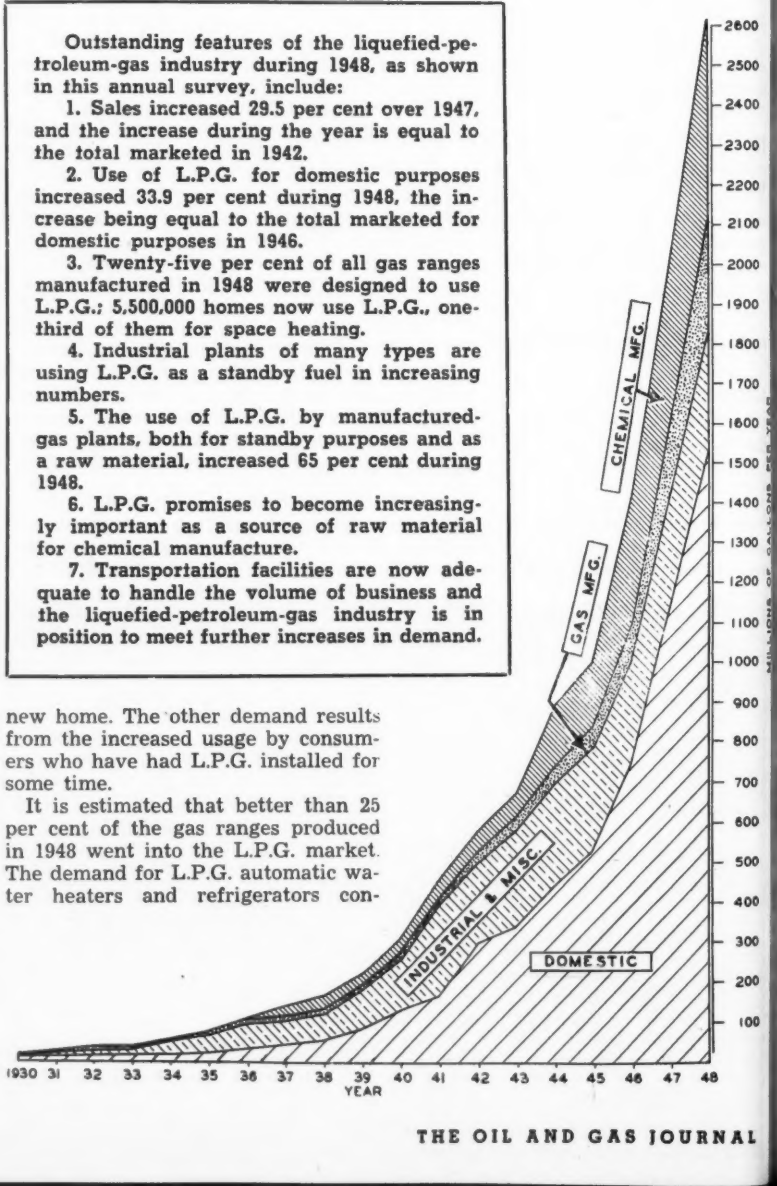


Chart shows annual L.P.G. consumption and portrays steady growth over past decade (Bureau of Mines, Mineral Industry Survey)

tinues to increase. Space heating with L.P.G. is enjoying a greater demand than ever. All of these demands are the result of the satisfaction which consumers are enjoying from the use of L.P.G.

It is estimated that there are now about 5.5 million homes using L.P.G. It is also estimated that one-third of these use L.P.G. for space heating as well as for the other household purposes. There are presently installed more than 3,000 bulk plants, a number which is about equal to the number of counties in the United States.

The amount of L.P.G. marketed for industrial and miscellaneous uses during 1948 is estimated at 280,000,000 gal. One of the most rapidly growing uses for L.P.G. by industrial plants is for standby to other fuels, generally manufactured or natural gas. Greatly increased domestic and commercial space heating requirements have resulted in demands that frequently exceed the capacity of natural gas transmission lines or that of manufactured-gas producing plants.

To meet this increased demand it has been necessary to force more and more industrial gas consumers to accept a lesser amount of gas during the peak-load periods. To insure against an interruption of gas supply, a large number of industries have installed L.P.G. as a standby fuel. These installations furnish varying percentages of the total gas load, in many instances supplying complete replacement with mixtures of L.P.G. and air. This replacement with L.P.G. assures continuity of production with a minimum of concern over burner and furnace operation.

The use of L.P.G. in gas-manufacturing installations continues its rapid increase. It is estimated that 280,000,000 gal. were used in 1948 for this purpose. This is an increase of 65.4 per cent over 1947. The increased distribution of natural gas throughout the country has in many instances resulted in excessive space-heating demands during the winter months. L.P.G. is used to a great extent to augment both natural and manufactured gas supplies during peak loads. A controlled amount of L.P.G. and air may be mixed directly with manufactured gas without encountering burner-operating difficulties, but the reforming of L.P.G. to produce a substitute gas is permitting even greater quantities to be used.

L.P.G. is used generally not only to feed the reforming units but also to enrich the produced gas to the desired heating value. Large proportions of L.P.G. and air mixtures may be mixed with natural gas or in some instances may replace natural gas completely without causing any unusual burner-operating difficulties. The installation by utilities of large new standby units or additions to present installations has continued throughout 1948. Almost 400 towns are now served with L.P.G. exclusively.

The volume of L.P.G. used for chemical manufacture is one of the most difficult to estimate. L.P.G. is used as an intermediate product which is processed to some other product, the latter serving as an ingredient of a required chemical. Large quantities of L.P.G. in the gaseous form are furnished to chemical companies through pipe lines directly

(Continued on page 135)

THE AUTHORS

K. W. RUGH

E. O. MATTOCKS

K. W. Rugh is manager of the Philgas division, sales department, Phillips Petroleum Co., Bartlesville, Okla. E. O. Mattocks is technical representative of the chemical engineering department of the same company.

TABLE I—MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GAS

Year	Total Sales		Distribution (thousands of gallons)							
	Gal. (in thousands)	Per cent increase	Domestic*	Per cent increase	Industrial and miscellaneous†	Per cent increase	Gas manufacture	Per cent increase	Chemical manufacture	Per cent increase
1922	223	....								
1923	227	24.4								
1924	376	36.0								
1925	404	7.2	Sale of liquid petroleum gas confined primarily to bottled-gas business prior to 1928							
1926	465	15.2								
1927	1,091	134.6								
1928	4,523	314.6	2,600		400	...	1,500		...	....
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7	....	....
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0	...	....
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57.6	....	....
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9	...	....
1933	38,931	14.1	16,626	2.3	13,987	71.3	8,318	—14.3	....	....
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,298	—24.3	....	....
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4	....	....
1936	106,652	38.8	30,014	40.4	67,267	40.4	9,371	23.6	....	....
1937	141,400	32.6	40,823	36.0	62,610	(‡)	11,175	19.3	26,792	....
1938	165,201	16.8	57,832	41.7	62,694	0.0	12,386	10.8	32,299	20.5
1939	223,580	35.3	87,530	51.4	93,723	49.4	15,435	24.6	26,892	—16.7
1940	313,456	40.2	134,018	53.1	124,482	34.5	20,285	31.4	34,671	29.0
1941	462,852	47.7	220,722	64.7	172,669	38.6	25,255	24.5	44,206	27.5
1942	585,440	26.5	303,857	37.3	197,149	14.3	31,366	24.2	53,038	20.0
1943	675,233	15.3	344,962	13.7	237,396	20.2	37,518	19.6	55,356	4.4
1944	898,071	33.0	445,617	29.0	254,590	7.3	45,879	22.3	151,985	175.0
1945	1,067,979	19.0	533,262	19.7	256,577	0.8	53,849	17.4	224,291	47.5
1946	1,410,370	32.1	758,466	42.2	253,745	—1.1	86,660	61.0	311,499	38.8
1947	2,008,262	42.4	1,150,538	51.7	274,125	8.0	169,332	95.4	414,267	33.0
1948	2,600,000	29.5	1,540,000	33.9	280,000	2.1	280,000	65.4	500,000	20.7

*Household use plus other requirements by these customers such as irrigation pumping, tractor fuel, flame weeding, chicken brooding, and similar uses. Included also is L.P.G. sold by domestic distributors but used for industrial purposes, internal combustion engine fuel, and for gas-manufacturing purposes. †Includes L.P.G. sold for fueling internal-combustion engines. ‡Not comparable due to segregation of chemical manufacturing.

Remarks: In this table total sales for all years except 1948 were obtained from U. S. Bureau of Mines reports. Distribution for the years 1931 to 1947, inclusive, was obtained from the same source. All other volumes were estimated by the writers. The total sales volume includes all L.P.G. (propane, butane, and propane-butane mixtures) when sold as such. Until 1944 the sale of pentane when sold for any purpose other than motor-fuel blending was included. Since then it has been excluded. It does not include butane when blended with heavier petroleum fractions for motor-fuel purposes. Intercompany sales transactions such as purchases of L.P.G. by one company from other companies and resold as L.P.G. have been eliminated in order to avoid duplication of sales figures. The data do not reflect sales of L.P.G. used directly by the producer at the point of production for fuel polymerization, solvent dewaxing, etc. Neither do the figures include sales of hydrocarbons to plants manufacturing synthetic rubber or aviation gasoline or their components.

Deep Zone in El Roble Enhances Pantepec's Venezuelan Holdings

by Dahl M. Duff

DISCOVERY of a new deep producing horizon in the El Roble concession in East Venezuela and other developments in the operations of Pantepec Oil Co., C.A., and Pancoastal Oil Co., C.A., were disclosed last week by C. U. Daniels, president of both companies, in letters to stockholders.

The second, entirely new producing horizon found in the deep Merecure formation by the recently completed El Roble 15 was termed by Daniels to be "a most important development." The 35,000-acre El Roble concession is jointly owned by Pantepec and Creole Petroleum Corp. with Creole as the operator.

El Roble 15 found the top of the Merecure at 10,000 ft. and was taken to 11,829 ft. Dually completed, with tubing packer set at 10,765 ft., the well is flowing steadily from two zones through ¾-in. choke and is producing more than 900 bbl. of 49.5°-gravity oil daily, Daniels reported.

Outposts Extend Field

El Roble 15 was one of two outpost wells recently completed in the field. The other, El Roble 17, proved a ¾-mile western extension of the upper Colorado producing section. El Roble 15 was drilled principally to prove productivity of the Merecure formation but it also gave a 2½-mile eastern extension of the sand production of the earlier El Roble wells.

Included in the letter dealing with Pantepec were excerpts from a report of Don R. Knowlton, of Knowlton Engineering Co., who studied the property in the interests of an independent group of stockholders. Knowlton said that although there is only limited data for an estimate at this time, it "appears possible that the Merecure could ultimately produce 500 to 600 million barrels" from Pantepec holdings in Roble. Knowlton said that if the company's holdings in the field ultimately embrace 30,000 productive acres, as is possible, the zones above the Merecure could ultimately produce as much as 600 million barrels. He pointed out a gasoline plant would materially increase recovery and that the amounts mentioned are gross figures with Pantepec's net approximately 40 per cent.

Knowlton described the Merecure formation found in El Roble 15 as indicating the existence of an exceptionally thick sand section of about 1,900 ft. with potentially productive zones totalling 400 to 500 ft. The Merecure also is found in several adjacent and neighboring fields.

Mulata Output High

Discussing the Mulata concession of 24,600 acres in the State of Monagas, Daniels said the proved productive area now covers approximately 8,500 acres with present production at 20,000 bbl. daily and a cumulative production to September 30 of about 43,000,000 bbl. Last April, two steam rigs were shifted to workover operations because of the shortage of tubular goods and a pressing need for well servicing. These rigs have now been returned to drilling on the field's southeast margins on an undetermined number of locations remaining.

Daniels said the stabilization and pressure-maintenance plant for Mulata is nearing completion and is scheduled to begin operations about the first of the year. This plant, costing $5,800,000, will increase the volume of the daily yield from the field about 6 per cent and will increase the gravity of the crude about 2°. The pressure-maintenance operations also will add appreciably to reserves that ultimately will be recovered.

Daniels said plans for the 1949 development of the Pantepec properties have not yet been fully crystallized. "Market conditions remain sound and we feel the price of oil justifies an aggressive program," he said. "We are also currently in process of arranging for the construction of a casing-head-stabilization plant to recover the fluids from gas currently being produced from the El Roble property."

Daniels' report dealing with properties of Pancoastal Oil Co., C.A., discussed operations at Tucupido, Pelayo, and Socororo in Venezuela. It also outlined the program of Peninsula Oil Leases, Inc., which through a subsidiary holds approximately 4,500,000 acres of submerged leases off the West Coast of Florida as well as a number of inland water bottoms.

Company Holds 320,000 Acres

Pancoastal has more than 320,000 acres of concessions in Venezuela with Pancoastal and Venezuelan Refining Co. each holding 50 per cent working interest. Venezuelan Atlantic has been carrying out an exploratory program since 1944 under terms of an option, exercised last April, to acquire half interest.

In regard to Tucupido, Daniels said drilling to mid-December showed a total of 1 dry hole, 2 gas wells, and 16 producing wells, of which 13 have been tested showing a total capacity of 9,900 bbl. daily of which 9,000 bbl. are currently being marketed with an average of two wells closed in.

Two dry holes and four producing wells have been completed on the Pelayo concession, the report said. The producers have an indicated daily total capacity of about 1,250 bbl., and Atlantic is now laying a pipe line from this field to Leona field which should be completed before the end of this year.

The first producing well was completed on the Socororo concessions, located on the west side of the Oficina district, on October 9 of last year. It tested 125 bbl. daily. Sand depth is 4,000 ft., and the depth and drilling conditions indicate economically completed wells, the report said. "Recent seismology by the company," the letter continued, "in partnership with Atlantic, indicates there is a considerable area favorable for exploration and development. Plans are being made to construct a pipe line from this field to Mene Grande's network serving the Western Oficina area."

New Iranian Pipe Line Will Add 100,000 Bbl. to Crude Exported

ANGLO-IRANIAN OIL CO., LTD., is scheduled to place in operation about April 1 a new 20 and 22-in. pipe line which will carry approximately 100,000 bbl. daily of crude oil from Agha Jari field to tanker loading facilities at Bandar Mashur.

Work on the 56-mile line was commenced early last fall. A recent report showed 7 miles enamelled, wrapped, and buried, 9 miles cleaned and primed, 21 miles welded, and all pipe in the hill country strung.

The line extends through extremely rugged terrain in the hill country after leaving the coastal area. Anglo-Iranian personnel are handling the construction. Pipe is being buried in the coastal area and laid above ground in the hill country.

As in Anglo-Iranian's existing pipeline network, gravity flow will be employed in the new Agha Jari-Bandar Mashur line. It will take about a third of the field's production of about 300,000 bbl. daily. Nine wells were producing in the field at the end of 1947, and several others have been drilled since.

New Tanks Under Construction

Bandar Mashur is on the Khaur Musa inlet about 70 miles east of Abadan. Near Bandar Mashur is the terminal of the original Persian Gulf-Teheran main line railroad.

At present, lines extend from Agha Jari to Abadan, the system consisting of three 12-in. the first 25 miles in the hill country and four 12-in. thereafter on account of the reduced rate of flow. A branch line extends off this system to the Bandar Mashur area to allow some crude oil to reach this port. The new line will lead direct from the field to Bandar Mashur, and six new tanks are being erected near the loading site.

Most of Anglo-Iranian's production goes to Abadan where the refinery and other loading facilities are situated. Tanker and other traffic on the El Arab River leading to Abadan is so heavy that diversion of some loadings to Bandar Mashur was considered desirable.

Steel for the new pipe line was obtained in the United States, and one point advanced in favor of the export license was that the relatively small amount of steel would make the large additional amount of 100,000 bbl. daily of oil available.

Of the 100,000 bbl. daily, Socony-Vacuum Oil Co., Inc., will take 40,000 bbl. daily, and Standard Oil Co. (N.J.) 20,000 bbl. daily. These two companies in December 1946 contracted with Anglo-Iranian to take substantial amounts of crude over 25 years and to participate in the construction of the projected 34-36-in. Iran-Mediterranean pipe line.

The remaining 40,000 bbl. daily at Bandar Mashur was originally slated to be taken by independent United States companies with refining interests in the Midwest. These companies are understood to have failed to exercise their option for the purchase, and the crude is expected to be placed on the world market.

Holman Denies Charge Jersey Favored by ECA

THE Marshall plan and the Economic Cooperation Administration have not changed the way in which affiliates of Standard Oil Co. (N.J.) in Western Europe or elsewhere do business, Eugene Holman, Jersey Standard president, said last week.

Holman made his comments in a letter to the Chicago Tribune following publication by the newspaper of an editorial which cited oil transactions among affiliates of Jersey Standard and Socony-Vacuum Oil Co., Inc., as "evidence that the people who put the Marshall plan over on the American people are cashing in on it."

Declaring he felt it necessary "to try to set straight a few things about this company's business," Holman said Anglo American Oil Co. has been an important supplier of oil products in the United Kingdom for decades, as has Standard Francais des Petroles in France.

"These affiliates as well as many others have for many years purchased crude oil and finished products from manufacturing or producing affiliates of this company in this country or elsewhere," Holman said. "The price they and our other established customers pay are the low quotations in the established world markets. . . ."

"Our affiliates abroad as well as all other concerns, U. S. or foreign, need dollars to purchase products from suppliers who sell for dollars.

"Now, as has been the case for some time, our Western European affiliates, just as anyone else, must apply to their governments for dollars in exchange for local currencies, to do the business in world markets essential to the economics of those countries. Some but not all of these dollars today have become available to those governments through operation of the Marshall plan, but that fact gives our affiliates no advantage in obtaining dollars over any of their competitors."

Shown here is the terrain being crossed by the Agha Jari-Bandar Mashur pipe line now under construction by Anglo-Iranian Oil Co., Ltd., in Iran. These lines are in the existing 12-in. system from Agha Jari to the Abadan refinery area (Anglo-Iranian photo)

Loans to Pemex, Private Participation Urged for Development of Mexican Oil

by Bertram F. Linz

WASHINGTON. — "Good neighbor" loans to the Mexican government for oil exploration and the construction of petroleum facilities, including an oil line across the isthmus, gas lines into consuming centers of both Mexico and the United States, a refinery, and other projects planned by Petroleos Mexicanos, was recommended last week by Chairman Charles A. Wolverton of the House interstate commerce committee in his final report on the fuel investigations made during the Eightieth Congress.

Such loans, it was indicated, would run in the neighborhood of $470,000,000 over a 5-year period, involving some $130,000,000 for geologic and geophysical activities and exploration drilling, $240,000,000 for development, $46,000,000 for gas and oil lines, and $32,000,000 for refineries. The program would involve some 350,000 tons of steel for exploration and 525,000 tons for development over a 5-year period.

Wolverton made it clear, however, that such loans should be contingent upon "an understanding that private companies be enabled to participate under reasonable terms such as there is indication presently are being worked out in current private negotiations," and that financial assistance be in the form of serial credits, with disbursement subject to a joint commission and United States disbursing agent, with full and serial reports concerning the use of the funds for the purposes allocated.

Private Capital Wanted

The Mexican government, Wolverton said, has made it clear that private capital will be "welcomed," but as an addition to and not a substitute for the Pemex program, and has laid before the committee a revised proposal for company participation.

Whether the report will carry any weight with the new Congress will depend upon the position taken by Rep. Robert Crosser of Ohio, new Democratic chairman of the committee, who visited Mexico last week as the invited guest of the Mexican government and was just returning to Washington when the report was filed with the House.

The original Mexican proposal to United States oil companies aroused little interest among the larger concerns. It provided that under the existing law Pemex would enter into

agreements by which the companies acted as its agent in the exploration for oil; and after the discovery of oil, Pemex would assume further operations and reimburse and comensate the companies out of the petroleum produced at 80 per cent of the gross production less pro rata expenses until the investment had been amortized, and thereafter, as compensation during the balance of the agreement, 20 per cent of the gross production, less pro rata expenses.

New Proposal Outlined

The revised proposal provided that the companies, still acting, in effect, as agents for Pemex, would operate on sites satisfactory to them, perform the requisite geophysical and other exploration, and engage in exploratory drilling. After discovering oil, the companies would either surrender operations to Pemex or operate as agents for it, and would be reimbursed for capital expenditure out of 50 per cent of the gross production with no deduction for expenses, and be compensated for their effort and risk out of 13½ per cent of the gross production without deduction for expenses, such 13½ per cent being net over all taxes or any charges whatsoever, and the companies also would have an option on the remaining petroleum beyond the necessary requirements of the Mexican economy.

The matter has been discussed with the companies by the committee, without disclosing the revised proposal, and the committee arrived at the conclusion that some companies may be able to reach an agreement with Mexico but others will not find the terms of the proposed arrangements sufficiently attractive.

The committee made a lengthy study of the Mexican situation, including a personal survey of Mexican operations by a number of members, and in its report reached the conclusions that:

"One of the most important matters facing us today is the achievement of a solidarity and good neighborly feeling among the countries of the Western Hemisphere.

"The United States has a prime stake in the Western Hemisphere becoming self-sustaining in the supply of petroleum.

"The exploration necessary to the proving up of reserves adequate to provide this self-sustaining position should be undertaken when the stringencies of time and materials are less severe, as at present, than during any actual emergency. The alternative is the diversion of critical materials and manpower to such effort, and the making of deeper cuts and stricter rationing in the civilian use of petroleum during such emergency.

"The United States and Mexico both have an interest in Mexico not becoming a net importer of petroleum.

"Mexico has a prime stake in the development of an exportable surplus of petroleum which will permit its continued economic development."

Some American companies and Pemex "are close enough in their negotiations that the parties appear to be reasonably within the area of eventual agreement," the report said, urging the State Department to use its good offices "to consummate the participation of these companies in Mexico to the end that such country's petroleum resources may become proved reserves."

Mexican Economy Analyzed

The committee's report included a thorough analysis of all Mexican industries and agriculture, pointing up to the fact that rapid and continuous development of manufacturing is less feasible as a solution to the country's financial problems than a stepping up of the production and export of oil.

"This, in turn, depends largely upon the rate of expenditure on exploration and development and the making of mutually satisfactory working arrangements with foreign oil interests," it was explained. "If exports of petroleum were to return to their peak level it would mean that, at present prices, such exports would account for 10 times the foreign exchange now earned by petroleum exports and would be equal to more than 50 per cent of the total exchange now being earned by all commodity exports."

The committee reviewed Mexico's petroleum history since production on a commercial basis began in 1901. Production reached its peak in 1921 at 193,000,000 bbl., it was found, and

thereafter declined steadily, standing at 46,900,000 bbl., in 1937, the last full year before expropriation of foreign-owned oil properties. Further declines occurred thereafter through 1945, but in the past 3 years production has been on the upgrade, reaching 56,300,000 bbl. in 1947.

Now, the committee said, Mexican imports of products are rising sharply and currently are coming entirely from the United States. Although Mexico exported 10,101,000 bbl. to the United States in 1947 and imported only 4,641,000 bbl., it expended some $3,700,000 more in those purchases than it received from sales in this country, because of the higher prices of the imported products as against those exported.

"From an examination of the economic background and current fiscal position of Mexico, it is evident why that country is expressing an interest in the development of its petroleum resources," the report continued.

"In the first place, the increased demand for fuel occasioned by its constant population growth and accelerated by its tremendous industrial and commercial expansion requires additional petroleum supply, although, to some extent, perhaps, the internal situation may be mitigated by recently developed gas reserves and new gas discoveries.

Export Profits Needed

"In the second place, the development of petroleum resources appears to be the sole source for providing the needed exports which will permit the Mexican economy to continue imports of consumer durables and other goods at past rates and continue imports of machinery and equipment needed in Mexico's industrialization program. Indeed, the irrigation and power programs, the rehabilitation of the transportation and communication systems, and other contemplated projects apparently can be met and ultimately paid for only through an exportable surplus of petroleum.

"While there is some evidence that in recent weeks, owing to various governmental activities, Mexico's financial position is somewhat better stabilized than it was earlier in the summer, such stabilization has been achieved only by temporary suspension of the accelerated rate of industrialization which Mexico recently has experienced and desires to continue. There can be no wonder, therefore, concerning the desire of that country to develop its petroleum resources within the practical and political considerations which naturally attain."

On the other hand, the committee said, there also are excellent considerations prompting United States interest in the development of Mexico's oil.

Our export trade of a half-billion dollars annually ultimately can be financed only by Mexico's having a substantial export trade, it pointed out. The world situation requires increased production, which can come from Mexico, and, even more significant, considerations of national defense and the position of the United States in the event of an emergency make it clear that "not only must we have reasonable assurance of the continuation of supply from present sources, but we must have additional sources available for such pyramided emergency demand, even though all possible steps should then be taken drastically to reduce civilian use for the use of the military.

"As the committee has stated before it is not at all clear what reliance can be placed on the Near East as a source of supply, so that dependence on the Western Hemisphere's sources becomes only a matter of reasonable prudence.

Hemisphere's Possibilities Listed

"Your committee has made some examination into the possible increased availability of petroleum in Brazil, Peru, Colombia, the West Indies, Guatemala, and other areas; but, outside of some recent likely developments in Canada, there appears little reason under present circumstances to entertain the hope of any great contribution in time of emergency from most Western Hemisphere countries.

"Our chief dependence in Western Hemisphere sources outside of the United States currently, perforce, is placed on Venezuelan production. Production in that country has increased rapidly. Further increases are programmed, and a substantial increase probably might be expected in an emergency. Most of this increased production, however, is arising from already proved fields, inasmuch as, up to the present revolution, no concessions since 1945 have been granted for further exploration. Your committee is unable at this time to appraise the degree of uncertainty, if any, which may exist regarding an assured supply from Venezuela owing to the recent political disturbances, nor the strategic considerations present in adequate protection of this water-borne transportation route.

"All of these considerations, however, do point up the importance of Mexico as a potential source of supply, inasmuch as there seems to be no disagreement whatever that Mexico possesses potentially large reserves."

The committee, however, was a little skeptical over the ability of Pemex to reach its announced goals of 365,000 bbl. daily production by 1953, as against the present 167,000 bbl. daily, and 463,000 bbl. daily by 1955 by the proposed expenditure of $470,000,000. However, it said, there is little question that expenditures under such a program would yield substantial quantities of oil.

International

Commercial Production Started in New Guinea

NETHERLANDS NEW GUINEA PETROLEUM CO. has announced the commencement of commercial oil-producing operations in New Guinea.

The first shipment of crude to come from the island has been loaded aboard a tanker at Sorong, and Klamono field is now producing at an initial rate of 4,000 bbl. daily.

Commercial production was made possible by the recent completion of a 30-mile pipe line through the dense jungle in the Vogelkop section of western New Guinea where the field is located.

Netherlands New Guinea Petroleum Co., or Nederlandsche Nieuw Guinee Petroleum Mij., is a joint concern of four American and one British-Dutch company. The Shell organization holds a 40 per cent interest and is the operator. Far Pacific Investments, Inc., representing Standard Oil Co. of California and The Texas Co., has 20 per cent, and Standard-Vacuum Oil Co., representing Standard Oil Co. (N.J.), and Socony-Vacuum Oil Co., Inc., 40 per cent.

Operations Resumed at Klamono

Oil was discovered at Klamono prior to the war, but the company lost approximately 90 per cent of its plant and equipment when the Japanese invaded the island. Operations were resumed after the war, and 2 years have been required to complete the necessary road through the jungle area. The new 8-in. pipe line parallels the roads and extends to the tankage and loading facilities at Sorong marine terminal. The company also is building a road into the Wasian area in the southeast corner of the Vogelkop section. Oil has also been discovered at Wasian as well as at nearby Mogoi. At Waisan prospects for commercial production are considered very favorable.

The Netherlands New Guinea company's terminal at Sorong, originally a small missionary settlement, has become a large base camp for American, European, and New Guinea employes. Men, food, supplies, and equipment were assembled at a staging area at Morotai and then moved 300 miles to Sorong by plane and barge. At times, the company had as many as 9,000 workers in the Vogelkop area.

The entire area in which the exploration and development has taken place is regarded as one of the most inaccessible and difficult oil men have yet encountered.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Girding for Battle

WASHINGTON.—Fears of the administration that States Rights Democrats and Republicans may form a coalition to defeat some of the measures on President Truman's "must" program are shown by the determined efforts which are being made to set up a congressional organization which would render such a combination ineffective.

The proposal to increase the membership of the House rules committee from 12 to 13, for instance, was based on the fear that the normal 8-to-4 margin might become a 6-to-6 standoff if the 2 determined Southerners on the committee, E. E. Cox of Georgia and Howard W. Smith of Virginia, should join up with the Republicans, as they undoubtedly would on Truman's racial-equality legislation and possibly on labor and other issues.

Without the approval of the rules committee it is very difficult to bring a measure up on the House floor for vote, and the committee thus occupies a position of major importance from which an administration's entire program can be wrecked unless it can be controlled by the party in power.

Two committees, ways and means and appropriations, do not require rules committee approval to get their measures on the floor, but they frequently have to apply to the committee for a rule barring the submission of amendments when a revolt of the general membership threatens.

With rules, ways and means and appropriations constitute the "big three" of the House committees and the new Democratic members have been carefully selected to get as many staunch administration supporters as possible. An overriding Truman majority on ways and means is necessary to insure action on tax revision, social security, and the Reciprocal Trade Agreements Act. The appropriations committee controls the purse strings, and since practically all of the President's proposals will require money, it is in a position to cripple any program such as housing or aid to education. Last session, it will be recalled, the appropriations committee created an awkward situation with respect to funds for the European Recovery Program and, had it not been checked by the Republican leadership, might have turned the Marshall plan into little more than a gesture.

While the organization plans are aimed at the big measures on the administration's program, they also may have an influence on the course of legislation affecting oil, such as the tidelands bill and synthetic fuels promotion.

Costly Mileage

THERE were more automobiles than ever on the road last year and they traveled farther, and the traffic congestion that resulted in and around urban areas will continue for some time, according to the Public Roads Administration.

In their efforts to keep traffic moving fast, state and federal officials found they were spending more money and producing less road than in the past.

During the first 11 months of 1948, contracts in the sum of $1,056,442,000 were placed for 37,422 miles of road, but in the same period in 1947 contracts for $832,033,000 covered 42,422 miles.

The increase in cost and the decrease in mileage reflect the steadily increasing expense of all types of road work and the high cost of revamping streets and roads in urban areas where property values are high.

Summing up the operations of the first 11 months of last year, the PRA reported that contracts for work on 19,184 miles of highway called for use of federal funds, while 18,238 miles of improvements were undertaken by the states solely with their own money. All of the states had highway projects of their own except Montana, Nebraska, and South Dakota.

The difference between urban and country road costs is well developed in the figures for two areas. North Dakota got a contract for 1 mile of road at a cost of $2,000, but another 1-mile contract cost Vermont $298,000.

Tidelands Strategy

CONGRESSIONAL supporters of legislation returning the tidelands to the states are confident they can muster up enough votes to get a bill passed, although its enactment over a presidential veto is highly doubtful, and also that they will be able to prevent adoption of a measure authorizing federal leasing of the underwater oil lands, and in that strength may lie their strategy.

In some quarters it is suggested that if the whole matter can be held in suspension for another year or so, the tidelands proposition may be less subject to political influences. If it can be held up until after the 1950 congressional elections, the measure may have even better chances of enaction, and while that is looking ahead pretty far there have been instances where legislation kicked around in Congress for much longer periods.

The general idea seems to be to have Congress pass the quit-claim bill, which probably would come late in the session, and then if the President vetoes it, let the matter rest until next year. Meanwhile, with the one bill being fought over, there is little chance that legislation providing for federal administration of the tidelands would get through, and the resulting stalemate would leave the doors open for further effort in 1950.

So long as the Senate does not amend its rules to eliminate filibusters, a few determined members of that body could prevent final action on either bill if the situation became tight. And much will depend, too, on the ability of the Truman leadership to keep party lines tight.

One Fuel Policy

MEMBERS of the House Interstate Commerce Committee who have been investigating the petroleum situation believe the time has come for Congress to adopt a national fuel policy, rather than separate policies for oil, coal, electric power, and natural gas.

Convinced by arguments of industry spokesmen that it must now be recognized that oil cannot fuel the entire economy, the committee believes the four power sources should be considered as a group if adequate assured supplies of fuel and energy are to be available for the expansion of our national economy and the maintenance of national security.

This belief is buttressed by uncertainties as to the future. It was not only oil shortages that threatened last winter, it is pointed out; natural gas shortages also occurred, and it was only by luck and great effort that shortages of electric power were averted.

The committee points out that considerable dependence now is placed on imports to keep supplies in pace with demand, and if this situation gives signs of permanence steps must be taken to assure reasonable certainty that imports will continue under whatever world conditions may develop. This, in turn, involves assurance of an adequate tanker fleet.

Rate Regulation Policy Does Not Force High Debt Ratios, FPC Says

WASHINGTON. — Natural-gas companies subject to Federal Power Commission regulation have not been forced to the use of high debt ratios in order to secure a fair return for the common stockholder because of the rates of return allowed by the commission, it was asserted last week by the FPC.

The commission's statement was made in rebuttal of a charge by H. Carl Wolf, managing director of the American Gas Association, last October, that "slavish adherence" by regulatory bodies to low fixed rates of return for the gas industry has forced natural-gas companies to seek cheap money rather than risk venture capital through junior equity financing.

That charge brought about a quick study by the FPC staff of the financial situation of natural-gas companies subject to its rate controls, and it was found that out of 23 companies having an annual operating income of $1,000,000 or more, 19 reported earnings on equity capital for 1947 of 10 per cent or more, 3 of them running above 20 per cent.

Fifteen of the companies had debt ratios ranging from 0 to 52 per cent. Where the ratios were higher it was usually as a result of bank loans, and the ratios will be reduced when the loans are retired. The highest debt ratio was reported by Texas Eastern Transmission Corp., 79 per cent; the debt consists entirely of bonds subject to serial maturities which will reduce the ratio by 1958 to approximately 50 per cent.

Between 1939 and 1947, seven companies decreased their debt ratios and eight increased them.

In fixing the rate of return, the report stated, the commission recognizes the importance of a rate sufficient to attract all classes of investment capital and endeavors, therefore, to keep constantly abreast of the changing conditions in the security markets. The earnings-price ratios of corporations having publicly held junior equity securities are commonly used as a measure of the cost of common-stock money, it was explained. They represent the ratio of the annual earnings of a share of stock to its market value at a particular date. The weighted average earnings-price ratios of nine natural-gas companies having common stock in the hands of the public was 9.9 per cent based on market quotations of December 2, 1948, indicating that the investor was willing to pay a premium for these common stocks and was satisfied with a return which is considerably less than the book earnings per share, which were more than 12 per cent.

"It is therefore clear that the rates of return fixed by the Federal Power Commission have not deterred investors from purchasing equity securities of natural-gas companies, thereby forcing such companies to finance their expansion programs through the issuance of debt securities," the report declared. "It is significant, too, that all issues of stock by natural-gas pipe-line companies in recent years have been sold without any difficulty whatsoever. The tendency on the part of the management of a few natural-gas companies to finance the expansion of their facilities almost entirely through the issuance of debt securities must be ascribed to other reasons than the rates of return fixed by the Federal Power Commission.

"In this connection it may be pointed out that the bulk of the common stocks of natural-gas pipe-line companies are closely held, with control resting either in holding companies, oil companies, other corporations, investment bankers, and officers and directors.

"In summary, the survey reveals that the natural-gas pipe-line industry as a whole is conservatively capitalized, that current earnings on equity capital are very favorable, and that equity capital is being invested to meet in part the large construction program which has been under way since the close of the war."

FCC Gathers Data on Oil-Service Radio Stations

WASHINGTON.—The Federal Communications Commission has granted West Production Co., Houston, a 6-month experimental license to operate its 5,000-watt Class 2 petroleum experimental radio station K5XCY, but explained that the grant was made for the purpose of obtaining information regarding the desirability of high power versus medium power for geophysical and certain other services in connection with new rules which are under consideration.

The commission said that the limited number of experimental stations now in operation or authorized will provide adequate information on the subject, and no authorizations for additional operations of this type would be warranted pending determination as to whether higher power can be authorized on a permanent basis.

"By withholding applications for such authorizations until such determination is made," it was explained, "applicants would be protected from unnecessary expenditures for equipment and installation, and at the same time assist in expediting action on rules under which such operation might be authorized on a regular basis."

Commission experts estimated that, in view of the volume of work before them, it will be at least a year before the final study can be completed.

Next Week

The Processing of Petroleum Begins at the Well Head . . . (Not the Refinery Gate).—Three Journal editors explain this point through their discussions of two new field plants located in producing areas 2,600 miles apart. Two of the staff members report on their inspection of Creole Petroleum Corp.'s new Jusepin field "triple function" plant, eastern Venezuela. Embodying the latest in petroleum engineering and process design, this installation performs (1) pressure maintenance, (2) crude-oil stabilization, (3) crude-oil desalting and dehydration. The other processing article describes the completion in northern Louisiana, by Sun Oil Co. and other operators, of a natural-gasoline plant which handles gas produced from 350 oil wells in three different fields.

Electrical Features of Shell Oil's New Electric Rig.—Article by a West Coast electrical engineer.

Corrosion Inhibition with Chromate.—The first article of an authoritative series which will cover general data, drilling production, processing plants, pipe lines.

New Mechanical Filter Replaces Slack Wax Sweating Operation.—The Journal's refining editor describes recent development by Tide Water Associated Oil Co.

In Canada.—Construction details of new 16-in. line which expands Northwestern Utilities' Edmonton gas system.

New West Coast Laboratory.—Equipment and projects involved in California Research Corp.'s (Standard Oil Co. of California) new $1,000,000 exploration-production laboratory.

Houdriflow.—Description of new improved moving-bed catalytic cracking process.

PERSONALS

Moore Made President of Two Pan American Firms

LEWIS W. MOORE has been elected president of Pan American Refining Corp. and Mexican Petroleum Corp. of Georgia to succeed D. J. Smith who resigned as president of the two refining companies after serving in this capacity for 4 years. Smith will retain his position as chairman of the board.

Both Pan American Refining Corp. and Mexican Petroleum Corp. of Georgia, subsidiaries of Pan American Petroleum & Transport Co., which in turn is a subsidiary of Standard Oil Co. (Ind.), operate refineries in Texas, Georgia, and Maryland.

Moore, who assumed his new duties on January 1, 1949, graduated from Massachusetts Institute of Technology with a B.S. degree in 1933, and immediately started his career in the research department of Indiana Standard at its Whiting, Ind., plant. In 1935 he joined Pan American Petroleum & Transport. In 1945 Moore was appointed manager of research of the company. He was appointed manager of manufacturing and was elected a director of Pan American Refining, Pan American Production Co., Pan American Gas Co., Pan American Pipe Line Co., and Mexican Petroleum, in 1947.

As president of Pan American Refining and Mexican Petroleum, Moore will have charge of the company's refining activities. He will continue to act as director of the other companies and will maintain his present office in the Chanin Building, New York City.

M. G. Watts is president of the newly organized Rocket Oil & Gas Co., Tulsa, which by merger has absorbed Liberty Royalties Corp., to engage in leasing, drilling and producing from oil and gas properties acquired in Oklahoma, Kansas, Texas, and New Mexico. Associated with Watts, as directors of the company, are **R. J. Nespor, Bradford J. Williams,** and **W. E. Bennett.**

James F. Neill, formerly assistant district superintendent at Midland, has been made assistant to division manager, West Texas division, producing department, The Texas Co., with offices at Fort Worth.

T. R. AUDE

T. R. Aude, manager, planning and economics, and **Cecil Hunt,** general counsel, Stanolind Pipe Line Co., have been elected directors of the company. Aude, an authority on pipe-line engineering and design, has been with Stanolind Pipe Line Co. since 1930 and has been manager, planning and economics since December 1947. He is particularly well known for methods he has developed for measuring capacities of pipe lines. Hunt joined Phillips Petroleum Co.'s legal department in 1929 and in 1937 was elected vice president of Phillips Pipe Line Co. He joined Stanolind Oil & Gas Co. April 1948 and in October was named general counsel of Stanolind Pipe Line Co.

William W. Valentine, president of Fullerton Oil Co., Los Angeles, Calif., has been elected a director of Union Oil Co. of California, to fill the vacancy caused by the death of the late S. M. Haskins.

Charles S. Garvin, Shell Oil Co., Inc., has been named retail manager for Shell stations on the Pacific Coast. Garvin started his career with Shell in a service station in San Francisco in 1927.

O. P. Nicola, Jr., chief scout of Phillips Petroleum Co., Bartlesville, has become director of proration for the production department. He has been replaced as chief scout by **Floyd Wheeler,** who was formerly in charge of the map room.

John O. Maberry, engineer and geologist, formerly with Shell Oil Co., Inc., has joined Sunray Oil Corp. and will become assistant to **W. W. Porter** in the Los Angeles office.

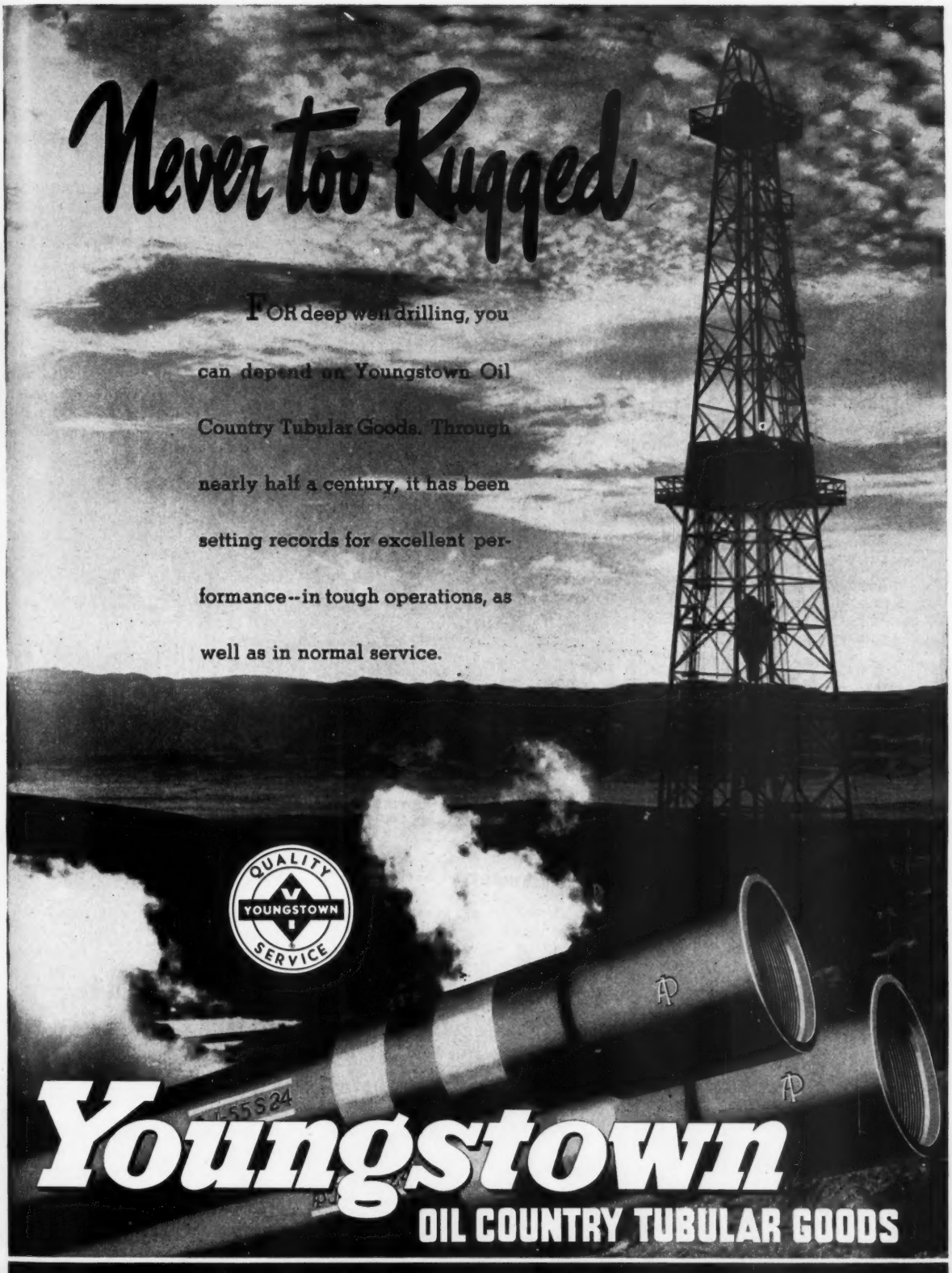
W. E. Schoeneck has resigned his position as division petroleum engineer, eastern division, Ohio Oil Co., to accept an appointment as vice president in charge of production in the Mid-Continent area with British American Oil Producing Co. Schoeneck is a petroleum engineering graduate of the University of Pittsburgh. He joined Ohio Oil Co. immediately after graduation in 1932 and has served with that company in various capacities since. In his work with British American, he will have charge of all producing and engineering operations in the Mid-Continent area.

Charles M. Ridgway, until recently, technical assistant for the refining division, Pure Oil Co., has been named to the new post of manager, research and development laboratories in Chicago.

Thomas J. Murphy, Jr., has been advanced to assistant district landman for The Texas Co. for West Texas and Southeast New Mexico with headquarters at Midland. Murphy replaces **J. W. Hunt** who resigned to join another company.

C. A. PERLITZ, JR.

Charles A. Perlitz, Jr., Houston, vice president and director of Continental Oil Co., has been appointed vice president and general manager of the company's operations in both Houston and Fort Worth regions. Perlitz, who joined Continental in 1946, will continue to make his headquarters in Houston. Prior to joining Continental, he served with Strake Petroleums, Inc., a Houston independent producing company. **H. B. Hurley,** presently production manager for the Fort Worth region, has been appointed assistant general manager of the Houston and Fort Worth regions. **H. L. Johnston,** who has been assistant regional manager at Fort Worth, will become regional manager, succeeding Hurley. G. T.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MAKING HOLE IN A HURRY

SPEED is music to the drill master's ear. And a sweet tune it was that the two "Caterpillar" Diesel D17000 Engines played for the Delta Drilling Co. on this operation in the Kentucky field. Powering a Standard Unit Rig and a 7¼ x 14 Gardner-Denver mud pump, they "sang" *through 1900 feet of soil and soft lime rock in four days.* Drill holes were 14½" at top, 8¾" at bottom. Up to the date of photograph, each engine on this rig had already operated more than 8000 hours. (Delta also has two other D17000s working in this field.)

No wonder chief driller D. S. Bryant says: " 'Caterpillar' Diesels are the most satisfactory engines we have ever used. They are more dependable and maintenance costs are very light."

P. S.—If any driller in the market for power is "on the fence" about today's best buy, he can learn about thousands of "Caterpillar" installations having outstanding records for long maintenance-free operation. And when, eventually, a "Caterpillar" Diesel does require overhauling or replacement parts, one of the most widespread and efficient dealer organizations of the kind stands ready to put it back on the job in "jig" time—another "tune" that owners always welcome.

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Pearson, formerly general production superintendent, Los Angeles, will succeed Johnston as assistant regional manager at Fort Worth.

L. E. ELKINS

G. H. CARD

L. E. Elkins, formerly chief engineer of the production department, Stanolind Oil & Gas Co., is being placed in charge of the new and expanded program of production research at the laboratories in Tulsa and **G. H. Card,** division production superintendent for the North Texas-New Mexico division is being transferred to the Tulsa general office as an assistant operating superintendent in the producing department.

The new chief engineer of the production department replacing Elkins will be **W. M. Elias** who has been

W. M. ELIAS

C. F. BEDFORD

unitization superintendent. Replacing Card in Fort Worth as division production superintendent will be **C. F. Bedford** who until now has been chief production engineer in the producing department in Tulsa. **Carl L. Larson, Jr.,** division exploration superintendent, will replace **John F. Cullen,** Rocky Mountain division manager, who has been named division consultant in the same division. **C. B. Caruthers,** assistant unitization superintendent, is being made unitization superintendent to replace Elias. **William B. McCabe,** division geologist, has been promoted to exploration superintendent in the Rocky Mountain division to succeed Larson. **R. C. Fast** will become division purchasing agent in Fort Worth where he has been transferred from Tulsa. **Arthur R. Brown,** division engineer, Fort Worth division, is transferring to the division drilling superintendent's staff as senior mechanical engineer. **Lewis Finch, Jr.,** will be the new Fort Worth division engineer.

Elkins joined Stanolind in 1934 as roustabout at Wink, Tex., and became field engineer there in 1935. In 1942 he was named assistant chief production engineer and for the past year has been chief engineer. Card joined Stanolind as petroleum engineer in 1932 and became district superintendent at Fort Worth in 1943. He was made division production superintendent in 1945. Elias has been with Stanolind since 1935 working first as a roustabout in East Texas. He became a field engineer in 1939 and in 1943 was named division industrial relations manager of the central division. In 1947 he was made unitization superintendent. Bedford first worked for Stanolind in 1932. He became district engineer at Beaumont, Tex., in 1935 and later moved to Houston as division petroleum engineer. In 1947 he moved to Tulsa as development superintendent and had been chief production engineer for the past year.

P. E. Lakin has been appointed executive vice president of Shell Oil Co., Inc. He began his career with Shell as clerk in Seattle in 1915 after graduating from the University of California. In 1933 he was appointed sales manager in the Mid-Continent area and three years later became vice president in charge of marketing. In 1945 Lakin, who will make his headquarters in San Francisco, was elected to the board of directors.

Joseph Neely has joined the Dallas geological office of Magnolia Petroleum Co. and **Orville B. Jordan** has been made assistant district superintendent of the Falfurrias producing district with headquarters in Magnolia's Falfurrias, Tex., office.

Conrad H. Collier has joined Tennessee Gas Transmission Co. as publicity director. Until recently, Conrad had been publicity director of the Houston Chamber of Commerce.

E. G. Dahlgren, assistant secretary of the Interstate Oil Compact Commission, resigned effective January 1 to become a consultant, with offices in the Braniff Building in Oklahoma City. Dahlgren, a geology graduate of the University of Wisconsin, served in the geological department of Indian Territory Illuminating Oil Co. until 1931. Later he became director of the conservation division, Kansas State Corporation Commission. In 1939 he joined the staff of the Securities and Exchange Commission in Washington, D. C., as valuation engineer. In 1942 Dahlgren became technical secretary of the research and coordinating committee, I.O.C.C. and was subsequently made assistant secretary of the commission in charge of technical activities.

Alva M. Johnson, division exploitation engineer, Shell Oil Co., Inc., Long Beach, has been appointed senior exploitation engineer with headquarters in Los Angeles. **Sherman L. Pease,** formerly senior exploration engineer, Los Angeles, has been named acting division exploitation engineer, Los Angeles Basin division, with headquarters at Long Beach.

John T. Rouse, Magnolia Petroleum Co., has been named president of the Dallas Geological Society. Other officers elected are: **H. V. Tygrett,** Atlantic Refining Co., vice president; **Gilbert P. Moore,** independent geologist, secretary-treasurer; **R. A. Stehr,**

Foreign visitors attending the December meeting of the Houston chapter of Nomads included Henry Shinouda, Anglo-Egyptian Oilfields, Cairo, Egypt; Paul H. Derrick, Caribbean Petroleum Corp., Maracaibo, Venezuela; Hassan M. Kamel, Anglo-Egyptian Oilfields, Ltd.; and E. P. Hayes, Colombian Petroleum Co.

PERSONALS

Seaboard Oil Co., and **Edgar Kraus**, Atlantic Refining, executive committeemen. Stehr is the society's retiring president.

J. R. POLSTON

J. R. Polston has been advanced to general manager of Stanolind Pipe Line Co., succeeding **J. B. Harshman** who recently resigned to become general manager of Utah Oil Refining Co. Polston, who is recognized as one of the foremost designers of pipe-line installations, graduated from the University of Oklahoma and first joined Stanolind Pipe Line in 1922. In 1926 he left Stanolind to become construction superintendent for Marland Oil Co. and later became process design and estimating engineer with Arthur G. McKee & Co. He returned to Stanolind Pipe Line in 1934 as mechanical engineer and in 1946 became assistant chief engineer and a month later, chief engineer. In 1947 he was made assistant general manager in charge of engineering and construction which position he held until this advancement.

Leo A. Snyder has been appointed vice president of Saunders Petroleum Co., Kansas City, Mo. He will handle purchases and sale of all petroleum products. Until accepting this position, Snyder had been a special consultant with Commerce Oil Corp., Warren, Pa, and W. H. Barber Co., Minneapolis.

C. W. STEWART

C. W. Stewart, formerly head of American Bitumuls Co., has been made president of Stancal Asphalt & Bitumuls Co., the consolidated company which absorbed the western marketing staffs of American Bitumuls and the asphalt divisions of Standard Oil Co. of California formerly known as California Asphalt Corp. **N. H. Angell**, formerly manager of Standard's asphalt division, will be vice president in charge of sales.

J. M. McNeill has been made assistant to **R. D. Gibbs**, vice president, Union Oil Co., with headquarters in Los Angeles. McNeill will be responsible for all contracts covering the sale, purchase, exchange, and processing of natural gas for the company.

Laurence E. Lees, consulting geologist and previously with Phillips Petroleum Co., has become associated with **James S. Noland**, independent lease and minerals broker also formerly with Phillips as district landman in the Permian basin. Their offices will be in Midland, Tex.

L. D. Bartell, district geologist at Shreveport, La., for Skelly Oil Co., has resigned to join McAlester Fuel Co. at Magnolia, Ark. **M. W. Beckman** has been named to succeed Bartell.

Comdr. H. V. Lavington has been elected chairman of Trinidad Petroleum Development Co., Ltd., to replace the late Col. H. C. B. Hickling.

G. E. T. Eyston, director in charge of development of C. C. Wakefield & Co., Ltd., arrived in New York recently from London for a stay of several months in the United States. The Wakefield company manufactures high-grade lubricating oils and greases at several plants in England. While in the United States, Eyston will visit laboratories and other installations of the industry, in connection with both the development and purchasing work of the company.

SHIFTS—

Wm. E. Kennett, geologist, Superior Oil Co., Paso Robles to Santa Maria, Calif.; **C. K. Walker**, engineer, Fluor Corp., Ltd., San Francisco to Los Angeles; **M. S. Legge**, engineer, Stanolind Oil & Gas Co., Hobbs, N. M., to Lubbock, Tex.; **John W. Sutherland, Jr.**, engineer, Sunray Oil Corp., Alice to Yorktown, Tex.; **Roy A. Moore**, superintendent, Rowan Drilling Co., Brownfield, Tex., to Hobbs, N. M.; **H. J. Bourke**, engineer, Warren Petroleum Corp., Fairbanks, Tex., to Maysville, Okla.

Lamar Strickland, engineer, Chicago Corp., Kingsville to Bishop, Tex.; **Robert L. Parker**, engineer, Parker Drilling Co., Midland, Tex., to Tulsa; **Howell M. Hamilton**, foreman, Stanolind Oil & Gas Co., Odessa, to North Cowden, Tex.; **R. L. Hoss**, engineer, Humble Oil & Refining Co., Tyler, Tex., to Houston; **W. C. Gorden**, superintendent, Shell Oil Co., Inc., Houma to Franklin, La.

DEATHS

Harris L. Cato, 72, president and manager of Cato Oil & Grease Co., died December 31 in Oklahoma City. He had been in the oil business since 1903 and has operated the oil and grease firm since 1922.

F. C. Van Norman, 88, pioneer oil man of Pennsylvania, Ohio, and Oklahoma, died December 31 at Tulsa. Van Norman was cited during the 1940 International Petroleum Exposition as "one of the industry's pioneers."

Edward Carson Harvey, independent Oklahoma oil operator, died December 31 in Chicago.

Harry M. Crighton, 62, independent oil man and former mayor of Conroe, Tex., died December 28 in that city.

Robert L. Vanderslice, 46, driller, died December 22 in Houston from injuries received in a rig accident near Dallas.

Hardin T. Griffin, 44, superintendent, chemical department, United Gas Pipe Line Co., died December 30 in Shreveport, La.

Earl Stilley, 48, geologist and oil producer, died in Wichita Falls, Tex., December 27. Stilley was responsible for the discovery of shallow oil pools on the Waggoner ranch, Wilbarger County, and numerous fields in Young, Archer, and Wichita Counties.

William E. Shaw, 79, former Pennsylvania oil producer, died December 19 in Oil City, Pa.

William MacAdams, 75, pioneer Canadian oil man and founder of Home Oil Co., died December 26 in New Westminster, B. C.

Charles L. Reed, 72, retired Gulf Oil Corp. scout, died January 2 at Vetrans Hospital, Muskogee, Okla.

Orville B. Miller, partner in M. M. Miller Oil Co., Dallas, died in an airplane crash at Alice, Tex., December 22.

H. T. Holding, drilling superintendent, Little Nick Oil Co., died December 26 at Chickasha, Okla.

Frank A. Wile, 72, retired Oklahoma oil producer, died December 27 at Bradford, Pa.

Gilbert Adam Stoufflet, 65, former rig building superintendent, Humble Oil & Refining Co., died December 26 at Cedar Bayou, Tex.

Jack C. Larson, 58, assistant superintendent, Houston Natural Gas Co., died December 27 in Houston.

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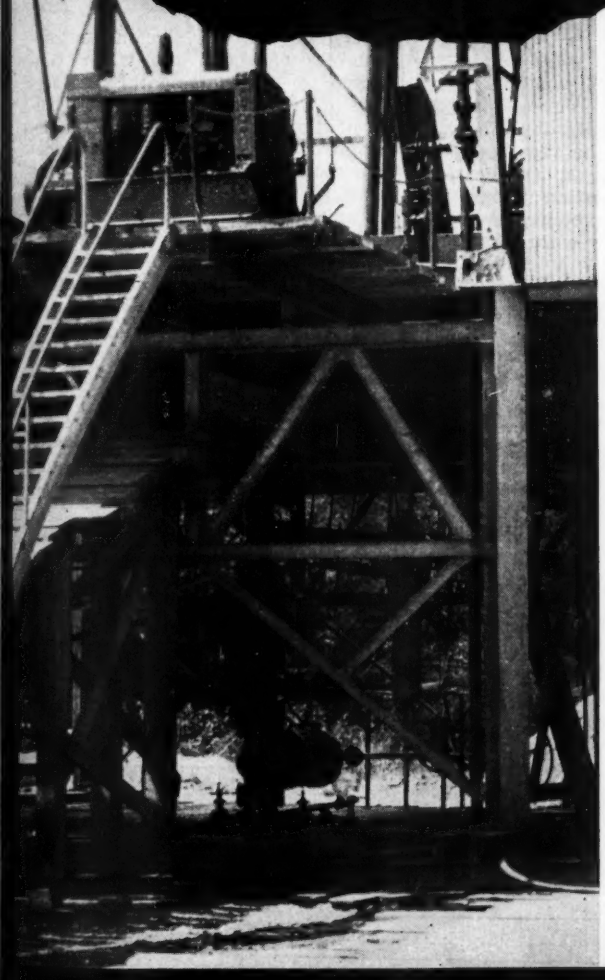

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UNION OIL CO. First Plant to Make DRY ICE from OIL-WELL GAS

by C. D. Gard

The CO_2 Extraction Plant

UNION OIL CO.'S CO_2 extraction plant in Santa Maria field, California, was placed in operation in May 1948. The process employs a 20 per cent solution of monoethanolamine with water. This solution is pumped over the top of a 20-tray absorber (90 in. in diameter, 49 ft. 9 in. high). The design liquid rate is 280 g.p.m. and the design natural-gas throughput is 30,000 M.c.f. per day at 80 psig.

The enriched solution leaves the base of the absorber through a liquid-level control valve, passing through three exchangers where it is heated by the hot lean solution from the reactivator. It enters on the twenty-first tray of a 23-tray reactivator (72 in. in diameter, 59 ft. 9 in. high). Design pressure is 94 psig. and design vapor capacity is for 2,100 M.c.f. per day of CO_2 and 6,112 lb. of steam per hour. The amount of CO_2 extracted at present is approximately 2,300 M.c.f. per day. The hot amine solution in the reactivator is contacted by steam vapor generated in two reboiler operating in parallel. The steam to the reboilers is regulated through a flow controller.

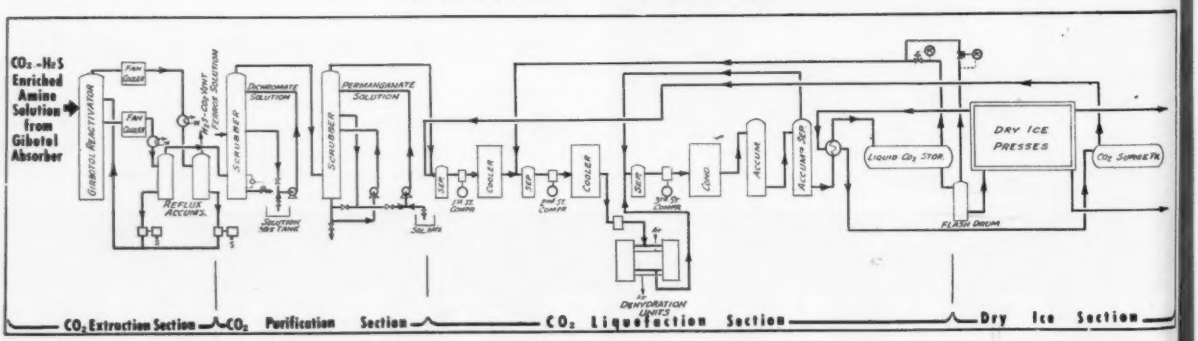
The reheated amine solution, after passing through the reboilers, is returned to the base of the reactivator and from there it goes to the exchangers, then to air coolers. The cooled solution then goes to the final water-cooled closed coolers, where the temperature is reduced to approximately 100° F. The cooled lean solution is pumped to the nineteenth tray of the absorber, thus completing the cycle. A flow controller on the liquid line to the absorber controls the solution rate.

The CO_2 gas stripped from the rich amine, together with the steam generated in the reactivator, leaves the reactivator in two streams, one from the top of the reactivator, the other from the vapor space above tray No. 20. This feature was incorporated to provide a choice of selecting the CO_2 stream that would have the lowest H_2S content for processing in the dry ice plant.

Each of the CO_2 streams is separately cooled and the water condensed by first passing through sections of the air cooler. The final cooling of the two CO_2 gas streams is accomplished by closed shell-and-tube-type coolers. The temperature on the overhead stream being cooled in the air unit is from 212° to 85° F., and in the final cooler to 75° F. The side-cut stream is similarly cooled from 220° to 85° F., the final temperature being approximately 75° F.

Vapors and water condensate from the final vapor coolers then pass to two separate accumulators, where the gas is vented and the condensate collected and returned to the system by a common pump with two separate liquid discharges. One of these liquid streams, about 2.5 g.p.m., is returned to the twenty-third tray of the reactivator, and the other stream is returned to the twentieth tray of the absorber. Purpose of returning this condensate is to conserve any amine present and to reduce the carryover of the amine in the overhead streams from the reactivator and the ab-

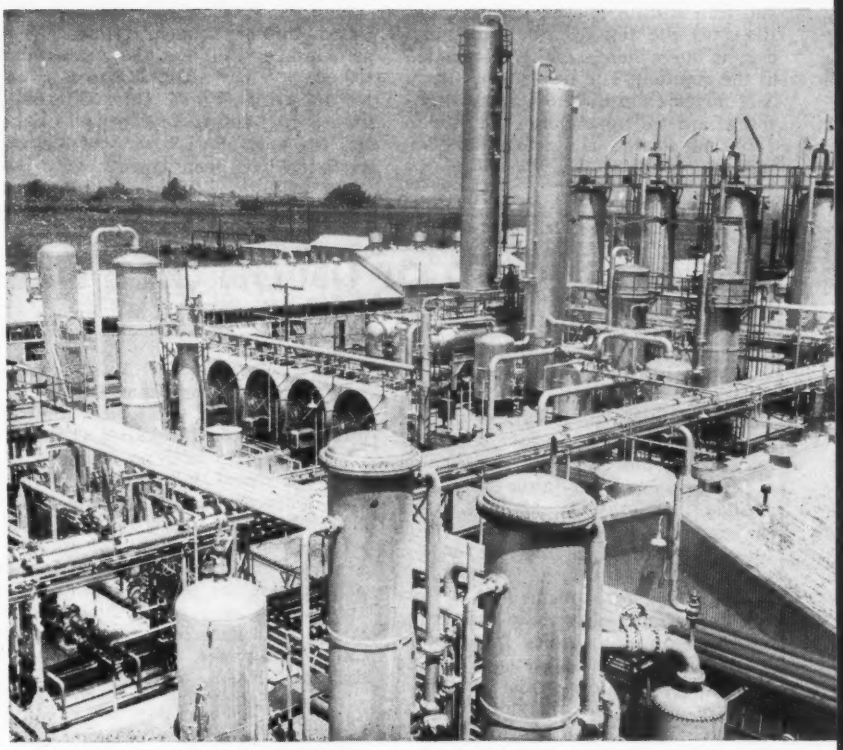
This is a simplified flow chart of the type of plant described here, which combines carbon dioxide extraction, purification, and liquefaction processing. (Details courtesy Girdler Corp.)



sorber. Control equipment was installed to vent the overhead stream and further process the side-cut stream in any desired quantity or the mixing of the two streams and the processing of a portion of the mixture.

Amine redistillation unit.—A redistillation unit was installed to provide a means of removing residues formed in the amine solution. This unit employs a reboiler unit through which a small stream of approximately 1 g.p.m. of amine is circulated for cleaning. Steam heat is supplied to the heating coils of the reboiler. The unit operates at atmospheric pressure and the overhead purified stream is returned to the circulating system.

The principal impurities which form the residue are thiosulfuric acid formed by a reaction between H_2S and oxygen and soda ash entering the solution from the soda ash contactors. The residue accumulates on the heating coils of the reboiler, and in time the heat transfer is reduced to the point where it becomes necessary to shut off the amine stream and agitate the heavy residue mass and accumulation on the tubes with steam entering a distribution pipe at the bottom of the reboiler. This operation is repeated, draining and refilling with fresh water until the heavy residue has been removed.

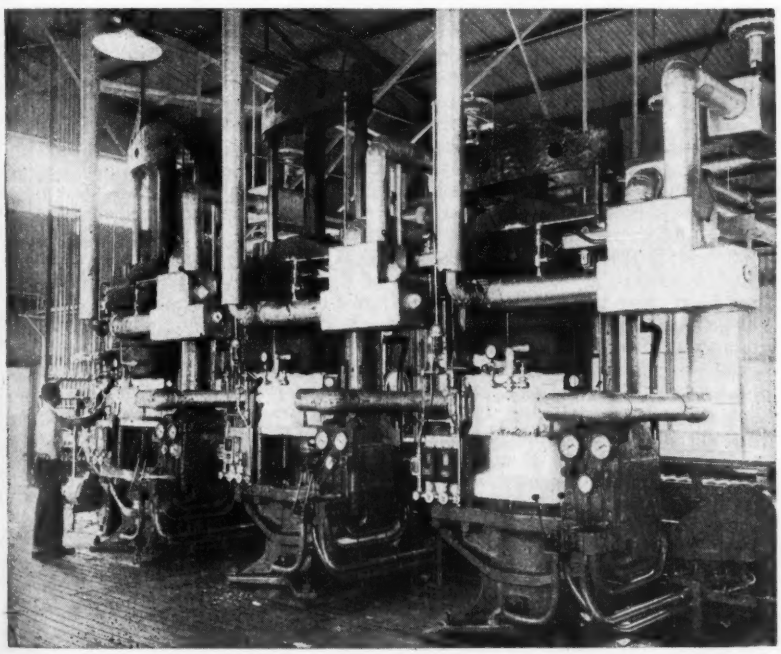


Center of processing area in Union's Santa Maria, Calif., dry ice plant. Of the two center columns, the right-hand one is the amine absorber, the left one is the amine reactivator. The two short columns to the right of the absorber are the soda ash-ferrox contactors, and the four larger columns at the rear are the dry oxide beds

H_2S Extraction Plant

The original equipment in the Santa Maria gasoline plant proper for the removal of H_2S, consisted of two contactors which employed a soda ash solution, the solution being aerated in a small forced-draft-type cooling tower. After aeration, the solution was pumped from the basin of the tower to the contactors. To reduce the effects of H_2S on the process equipment, the incoming 80-psig. gas was passed through the soda ash contactors, then compressed to 200 psig. At this pressure the final purification of the gas was obtained by passing it through beds of iron oxide-impregnated wood shavings before going to the natural-gasoline absorbers.

Picture of the dry ice presses, viewed from the operating side. The press at the left is being filled with liquid, the press in the center is "snowing," and the press at the right has just ejected a dry ice cake from press chamber



In reviewing the various possibilities for improving the extraction in the soda ash towers, the idea of carrying finely divided iron oxide suspended in the soda ash solution seemed to offer possibilities. A trial operation was made using ferric chloride as a source for the iron. It was noted that the iron rapidly turned to iron sulfide, and the H_2S content of the exit gas was considerably reduced. Many difficulties with this process, however, were experienced, these being chiefly in the reconversion of the iron sulfide to iron oxide.

The process that was eventually developed uses a soda ash solution in which is suspended the iron oxide. After passing through the contactors, the foul solution is vented in a separator to remove as much of the hydrocarbon gas as possible. It then passes through a series of long, horizontal troughs in which the foul solution is agitated with air, converting

the iron sulfide to free sulfur which floats to the top of the liquid, and iron oxide which remains suspended in the solution. The free sulfur slurry is removed from the troughs by skimming and the reactivated solution is returned to the contactors to complete the cycle.

As a result of this development, the H_2S content of the gas is reduced from an average intake of 34 grains per 100 cu. ft. to an outlet of 3 to 4 grains per 100 cu. ft. Ferric chloride is still used as the source of the iron oxide, and the over-all H_2S removal operating cost has been considerably reduced. The sulfur in the slurry is in the pure form; however, associated with it is a high percentage of water with some soda ash and iron oxide. No process changes have been made in the operation of the dry oxide beds and their replacement cost has been materially lessened.

BACKGROUND OF UNION OIL'S NEW "DRY ICE" PLANT

THIS new installation at Santa Maria, Calif., is believed to be the first plant commercially to extract carbon dioxide from oil-well gas for the manufacture of dry ice. Union didn't build this plant primarily for dry ice production. Rather, gas from Santa Maria field had an unusually high CO_2 content, and a much more favorable price could be obtained by removal of sufficient CO_2 to yield 1,000-B.t.u. gas for outside sales. However, Union also made processing and economic studies for a plant to convert the extracted CO_2 into dry ice, and found that would be a profitable supplemental operation.

The new dry ice plant is the latest phase in the growth of a very interesting gas-gasoline operation in that field. A background of the developments leading up to the CO_2 plant is as follows:

Natural gas produced in Santa Maria field is in several respects unlike that produced in general from other California fields. It has a relatively low 21.9 natural gasoline content (0.86 gal. per 1,000 cu. ft.), a low liquefied gas content (0.75 gal. per 1,000 cu. ft.), is high in CO_2 (16 per cent), relatively high in hydrogen sulfide (34 grains per 100 cu. ft.), and a low heating value (950°-960°). All gas is produced at low pressures. The oil is of low gravity (12° to 16° A.P.I.), although some oil of gravity as low as 6 is produced.

The present processing program developed in about three successive stages:

1. During the period prior to 1943, the gas from Union Oil leases only was compressed by one 150-hp. unit to 75 psig. and delivered for processing to an existing plant 7 miles away.

2. During the war, facilities were installed for the gathering of all wet, unconserved gas in the entire field, and processing it in an absorption plant built at the original compressor location. This plant was largely built with salvaged equipment where available.

Plant capacity was 18,000 M.c.f. per day, with the gas being compressed from 22 to 80 psig. and then contacted in two soda ash towers for removal of a portion of the H_2S. The H_2S at the time was about 12-15 grains per 100 cu. ft. and the CO_2 content only about 8-9 per cent. The gas next was compressed to 200 psig., partially cooled, and contacted in beds of dry iron oxide impregnated wood shavings for the final removal of H_2S. The gas was then cooled and contacted in two 200-psig. oil absorbers for the removal of natural gasoline and some L.P.G. fractions.

With the above facilities, some gas was delivered directly to Southern Counties Gas Co. for sale at 200 psig. for local consumption, the remainder going to Union's Orcutt plant for recompression at 400 psig. for sale to the gas company for other deliveries.

The gas company during this period installed a glycol gas dehydration plant within the Santa Maria absorption plant site.

3. In late 1945, other compressors and a 450-psig. absorber were added to again increase the volume of gas handled. Changes were also made in the liquid fractionation cycle to retain additional volumes of light liquid fractions, and the gas company installed a 450-psig. glycol gas dehydration plant. As the result of these changes, the plant processing capacity was increased to 30,000 M.c.f. per day.

CO_2 and H_2S extraction.—Prior to the last increase in plant capacity, the CO_2 content of the residue gas had gradually increased to objectional concentrations in the residue gas delivered to the gas company. Also, a more favorable price for the gas could be obtained by removal of sufficient CO_2 to assure delivery of 1,000-B.t.u. gas. During this time, the H_2S content had slowly increased from the former 12 grains per 100 cu. ft. to around 30 grains.

Two studies were initiated to improve these conditions: (1) Plans for a CO_2 extraction plant, and (2) development of more effective means of removing H_2S in the 80-psig. plant, as the operation of the dry oxide beds was becoming expensive. At the same time, with the increasing CO_2 content, the amount of H_2S removed by the soda ash contactors became less, the sodium carbonate being rapidly converted to bicarbonate by the CO_2.

Plans for building the CO_2 extraction plant materialized in June 1947, after reviewing various processes for CO_2 removal. Selection of the Girbotol system was made after consideration had been given to the possible manufacture of dry ice from the extracted CO_2, as it was believed that the minimum H_2S content of the extracted CO_2 resulting from the use of this process would be an advantage if dry ice were made. The design of the process was made by the Girdler Corp. of Louisville, using monoethanolamine as the solvent, it being more favorable for the extraction of the CO_2 with minimum H_2S content.

THE AUTHOR

C. D. Gard, author of this article, is chief process engineer, field, for Union Oil Co. of California. Gard was president of California Natural Gasoline Association 1944-45. He joined C.N.G.A. 2 months after its organization in June 1926 and has been active in its work since. A graduate of University of Southern California in 1917, Gard saw service in U. S. Naval Aviation during the first World War. He went with Union in January 1921 and has served as plant engineer supervising construction and operation of natural-gasoline plants, superintendent of gas operations, and was given his present assignment in March 1941 with headquarters at Santa Fe Springs, Calif. This paper, slightly abridged here, was a feature presentation of the last C.N.G.A. meeting.

In an attempt to derive an income from the sulfur removed by this process, amounting to approximately 1,100 lb. per day, the H_2S slurry is presently being washed with waste water from the cooling tower system. This water is normally wasted to control the concentration of total dissolved solids for the purpose of lessening scale deposits on the cooling and condensing equipment of the absorption-plant system. This washing is quite effective in increasing the sulfur content of the slurry, and it now appears likely that a market can be developed for the sulfur, either in slurry form or in dry powder.

The Dry Ice Plant

The process of making dry ice as practiced at the Santa Maria plant involves the purification of that portion of the CO_2 stream vented from the reactivator overhead or side-cut condenser. There exists in the total CO_2 stream now being removed from the natural-gas stream approximately 130 tons of CO_2 per day. The maximum volume of CO_2 gas processed in the dry ice plant is anticipated to be approximately one-half this volume, the plant having a design rated capacity of 56 tons per day. After reviewing the process cycle used by some existing dry ice plants and discussing the problem in detail with Girdler Corp., it was decided to employ Girdler for the design of the plant and the purchase of the materials.

The ultimate design deviated from the practice which uses supplemental refrigeration for obtaining low temperature liquid CO_2. An engineering study of the problem indicated that it would be advantageous to obtain the necessary low-temperature liquid CO_2 by stage venting and recycling the vented vapors, rather than applying mechanical refrigeration for this purpose.

Purification of the CO_2.—The 20-psig. gas from the extraction plant is passed through two 48-in. double contact purification columns operating in series. The CO_2 gas stream enters the lower portion of the first of these two columns where it is contacted with a portion of the ferric oxide-soda ash solution used in our primary H_2S extraction plant. This contacting removes practically all of the H_2S in the CO_2 stream. The original design provided for contacting the gas in the upper portion of this first column with a solution of borax and potassium chromate. However, a short period of operation indicated that the solution was used up at such a rapid rate the cost would be objectionable, and it is our plan to circulate our ferric oxide solution in the upper half, replacing the chromate solution. The ferric oxide solution can be reactivated and no means were provided for reactivating the chromate solution.

The CO_2 stream passes from the first column into the lower portion of the second column where it is contacted with potassium permanganate solution. The upper portion of the column also contacts the gas with permanganate solution. The spent solution from the lower portion is discarded and replaced by the partially spent solution from the upper portion. The upper portion is then recharged with fresh solution.

The first column removes all of the H_2S and the second column will remove any traces of H_2S that might pass through as well as traces of amine which might give the ice an objectionable odor. The liquids are circulated through the columns at the rate of 30 g.p.m., each liquid stream being separately pumped.

CO_2 compression and liquefaction.—From the outlet of the second column the purified CO_2 stream is delivered to the intake of the compressors at the dry ice plant. Here the gas is compressed to 140 psig., cooled, and then goes to the second-stage compressors, where the pressure is raised to 520 psig., then cooled, dehydrated, and further compressed to sufficient pressure to cause liquefaction to occur at the temperature of this stream leaving the final cooler. A maximum condition of 1,100 psig. and 85° F. was anticipated.

CO_2 dehydration.—To avoid difficulty of freezing in the colder streams of CO_2 liquid and vapor, it became necessary to dehydrate the CO_2 gas stream prior to the liquid stage. This was accomplished by a solid desiccant dehydration unit on the suction to the final stage of compression of CO_2. The dehydrator consists of two units which may be alternately placed in operation by means of a manifold.

Each unit is filled with 1,200 lb. of activated alumina and is capable of removing 7 lb. of water per hour from 12,000 lb. per hour of CO_2 gas with a final dew point of —40° F. The design pressure of the unit is 650 psig. The operating cycle is 8 hours. The beds are reactivated by blowing air, heated by a steam heater through the saturated bed and venting to atmosphere.

CO_2 cooler and condenser.—It was realized that for short periods each year temperatures normally obtained by the conventional cooling tower method might be above the critical, in which case, no condensation would occur. The type of cooling tower selected, therefore, was an evaporative cooler.

Liquid expansion.—Liquid from the high-pressure accumulator is float-controlled into a 3 by 8-ft. vertical vent tank operating at 510 psig. Vapor is vented from the top of the separator and returns to the suction of the final stage compressor. The liquid leaves this separator at 35° F. and enters a second separator at 235 psig. The vent vapor returns to suction of the second-stage compression. This separator (104 in. in diameter, 33 ft. in length), is mounted in a horizontal position and serves as CO_2 liquid storage, the temperature being —10° F.

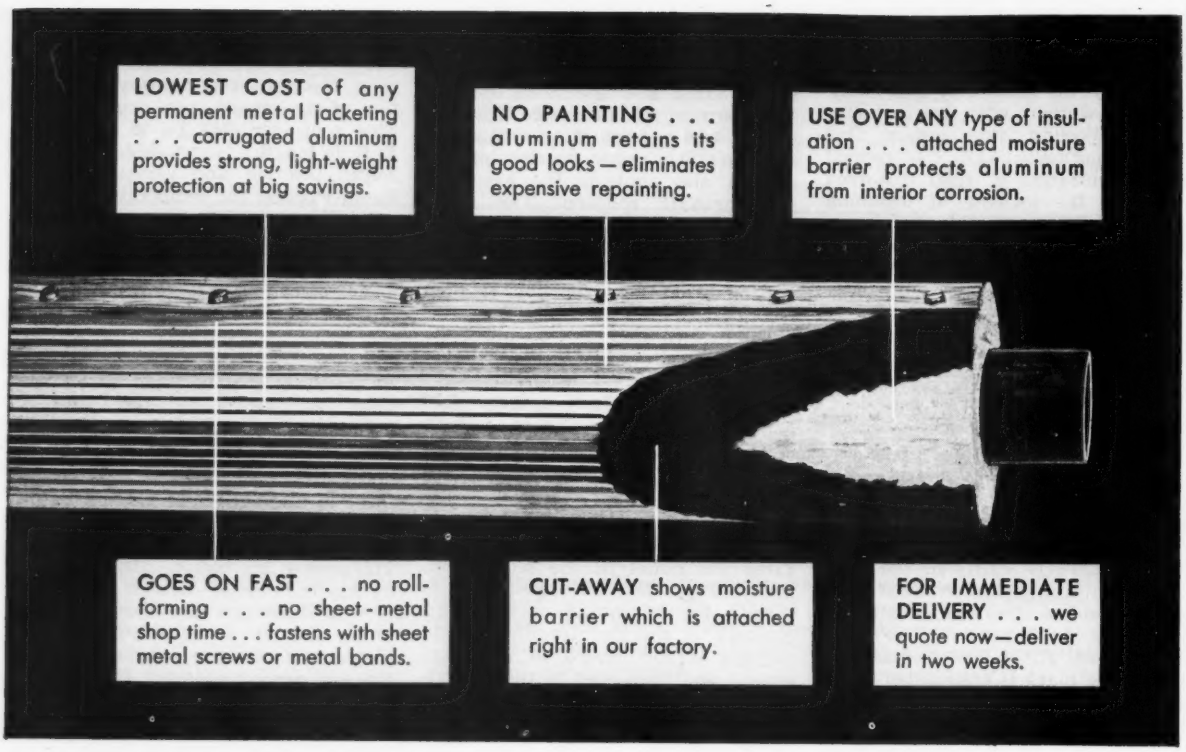
From the storage vessel the liquid CO_2 is float-controlled into the 3 by 8-ft. vertical final flash drum which is constructed of stainless steel, having a normal working pressure of 165 psig. Flash vapors from this vessel return to the suction of the second stage compression, and the liquid at minus 40° F. is piped to the dry ice presses.

Dry ice presses.—These presses are three in number (Type 250 ton Baldwin Southwark), each capable of making 18 to 20 tons of dry ice per day. The presses are individually operated by electric - motor - driven hydraulic pumps. There are two hydraulic systems, one to raise and lower the platen, the other to raise and lower the compressor plunger. During the operation of the press, the required amount of liquid is fed into the press chamber where flashing occurs, and the flash vapor is vented from the press chamber at approximately 80 psig. which is just above the triple point. Flashing continues for approximately 2 minutes. The venting continues for another minute, during which the vent control valve is opened wide and the pressure in the press chamber decreases to around 40 psig. The gas vented from the press goes directly to the interchanger on the liquid stream between the high-stage liquid CO_2 accumulator and the first-stage flash drum. Here the temperature of the vented gas is raised from —80° to 0° F. and then goes to the CO_2 vapor surge drum. The gas from this chamber goes to the suction of the first-stage compressor. A flow controller is used to prevent the full surge of the vent volume from entering the compressor.

At the close of this second period, venting continues through a second valve for 1½ minutes directly to the suction of the first-stage compressor until the pressure in the press chamber is approximately 20 lb. The remaining vapor in the chamber is then manually vented to air.

At this time the CO_2 in the press chamber is in the form of a snow and is ready to be compressed into the cake. This is accomplished by lowering the compression plunger and applying hydraulic pressure of 2,200 to 2,500 lb. on the plunger. This compresses the snow into a cake having the approximate dimensions of 20 by 20 by 10 in., and weighing approximately 240 lb.

An analysis of the dry ice produc-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CUT-AWAY shows moisture barrier which is attached right in our factory.
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tion to and from the presses is:

CO₂ TO AND FROM DRY ICE PRESSES

	Lb./hr.	Per cent of total
Dry ice from presses	4,660	51.78
Vent loss to atmosphere unaccounted loss	820	9.11
Blowback from presses to compressors	3,520	39.11
Total	9,000	100.00

Sawing and wrapping.—After leaving the press, the dry ice cake travels to two band saws, cutting four cakes, each being 10-in. cubes. The cakes then proceed on the conveyor to the wrapping table where they are wrapped in a heavy manila bag, tape-sealed, and weighed on an automatic scale.

Car loading. — Specifically constructed dry ice cars are spotted at the Santa Maria loading site. These cars are heavily insulated and are somewhat similar to the standard refrigerator car. Dry ice in the packaged form is loaded into the cars, placing them 7 blocks wide, 33 blocks long, and 5 blocks high, with a total of 1,155 cakes per car. The cakes must be positioned to avoid any movement during shipment, as such movement has a tendency to fracture the cakes.

Any space remaining between the rows of dry ice cakes and the car body is filled with sawed slabs of dry ice. Additional slabs are placed on top of the top row of cakes, all of these slabs being unwrapped. In addition to filling the spaces, the slabs provide a quick chilling of the car; thus reducing the loss from the wrapped cakes during transit. Specially built dry ice blankets are placed on top of the loaded ice to further reduce the loss during shipment. The net loaded weight of these cars is approximately 69,000 lb.

A 30 by 10 by 5-ft. dry ice storage bin has been provided for the storage of dry ice manufactured during the period no cars are immediately available. A truck-loading dock also has been provided.

Aviation-Gasoline Characteristics—January and July 1948 Production

by W. C. Holliman,* M. G. Barker,† and Nancy Potts‡

THE third and fourth of a series of reports§ on the characteristics of commercial aviation gasoline show the constancy in physical properties of aviation gasolines manufactured in the United States during the 2-year period of the survey. These reports, made by the Bureau of Mines under a cooperative agreement with the Coordinating Fuel and Equipment Research Committee of the Coordinating Research Council, Inc., contain compilations of inspection test data on their products furnished by cooperating manufacturers of aviation gasolines, and special data obtained in Bureau of Mines laboratories on samples of the gasolines. Comparisons are also given with data obtained in previous surveys made by the Bureau of Mines or surveys formerly conducted by the National Bureau of Standards under a similar cooperative agreement.

Comparative data from the two present and two preceding surveys are shown in the accompanying table. These data are averages by grade of the several samples, the number of which is given in the table for each grade and sampling period.

Aviation gasolines usually are manufactured with characteristics that will fall within limits set out in specifications such as AN-F-48a or A.S.T.M. Designation D910-47T. The average data, as shown in the accompanying table, fall within the prescribed limits. The reports indicate that this generally is true also with the characteristics of the individual gasolines. There is enough latitude in the specifications to permit trends; however, a study of the comparative data shows the gasolines to be very uniform in characteristics over the 2-year period.

Octane and performance numbers generally exceed the minimum designated in the specifications. The greatest variation in either over the four surveys is in rich-mixture performance number of the 115/145 grade, where the variation is 2.2. Tetraethyl lead content in each of the grades shows a slight and not entirely consistent increase throughout the surveys. Reid vapor pressure is uniformly about ½ lb. below the specification maximum.

No significant trends are observed in aniline point, distillation characteristics, sulfur content, or specific gravity; a slight decrease in kinematic viscosity over the four surveys, however, is observed in each grade except that of the July 1948 survey for the 80-grade and the 115/145 grade where the average values for this characteristic show small increases from the previous low value.

Each of the reports contains 12 tables of data and 11 figures showing properties and trends. Either or both, as well as copies of the two previous survey reports, may be obtained free by writing to the Bureau of Mines Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

*Petroleum research chemist. †Petroleum chemist. ‡Chemist, Bureau of Mines. §U. S. Department of the Interior, Bureau of Mines Reports of Investigations 4424 and 4435.

AVIATION-GASOLINE CHARACTERISTICS-COOPERATIVE DATA FOR SEVERAL RECENT SURVEYS (AVERAGE BY GRADES)

	Grade 80				Grade 91/98				Grade 100/130				Grade 115/145			
Test—	Mar. 1947	July 1947	Jan. 1948	July 1948	Mar. 1947	July 1947	Jan. 1948	July 1948	Mar. 1947	July 1947	Jan. 1948	July 1948	Mar. 1947	July 1947	Jan. 1948	July 1948
Number of samples	18	18	18	19	20	20	20	17	22	20	21	22	10	9	9	8
Octane No.:									iso+	iso+	iso+	iso+				
Lean mix*	80.4	80.5	80.3	80.1	93.3	93.0	92.8	93.4	0.15	0.16	0.13	0.13	....	....	....	....
Rich mix†	....	....	....	....	98.6	98.9	98.6	98.8	....	....	....	....	....	....	....	....
Performance No.:																
Lean mix*	....	....	....	....	....	....	....	....	105.9	106.1	105.1	104.8	118.2	117.9	117.6	116.7
Rich mix†	....	....	....	....	....	....	....	....	130.9	131.2	130.7	130.6	148.0	146.8	145.8	146.2
TEL, ml./gal.	None	None	.13	.15	2.80	2.77	3.29	3.15	3.36	3.52	3.59	3.70	4.35	4.49	4.54	4.50
R.v.p., lb.	6.4	6.3	6.6	6.3	6.5	6.3	6.5	6.5	6.3	6.3	6.5	6.4	6.3	6.5	6.5	6.4
Aniline point, °F.	144.7	146.2	142.6	142.4	139.8	140.3	136.1	138.9	152.7	153.4	149.6	146.9	157.6	156.2	155.3	156.8
Distillation characteristics, °F., evap. basis:‡																
10 per cent	150	150	145	148	148	150	147	147	152	150	148	148	151	148	147	153
50 per cent	197	196	191	193	198	198	192	194	207	207	202	202	212	211	209	211
90 per cent	242	238	236	236	241	240	233	236	246	246	244	245	243	245	250	243
Sulfur, wt. per cent	.015	.017	.016	.015	.018	.019	.017	.019	.016	.020	.018	.018	.030	.019	.022	.018
Sp. gr., 60°/60° F.	.705	.705	.706	.707	.710	.712	.712	.711	.702	.703	.704	.706	.701	.701	.700	.701
Visc., kinematic, 70° F., cs.	.604	.603	.592	.594	.606	.606	.592	.591	.615	.618	.605	.604	.616	.613	.606	.619

*A.S.T.M. D614-46T (C.R.C. F-3, AN-F-19). †A.S.T.M. D909-47T (C.R.C. F-4, AN-F-18). ‡A.S.T.M. D86-46.

Better Completions Realized From Use of Mud Acid Ahead of Cement

by E. F. Kelly *

THE use of mud acid ahead of cement in more than 250 cement-squeeze jobs on the Texas-Louisiana Gulf Coast since May 1948 indicates its growing acceptance for this recently developed application. The use of mud acid in cement-squeeze jobs was early employed by Stanolind Oil & Gas Co. in Hastings field, Brazoria County, Texas, and a large share of credit for this development is due the engineering staff of that company.

It generally has been believed that mud sheath, or filter cake, on the wall of the hole behind the casing, is the most important factor contributing to the failure of many cement-squeeze jobs. For the purpose of this discussion, the term "failure" shall be taken to mean, (1) failure to obtain a suitably high pumping pressure while squeezing cement, or, (2) failure to obtain a complete "shut-off" of the squeezed interval, as evidenced by unsatisfactory hydrostatic test or failure to give a "dry" drill-stem test, after drilling out the squeezed interval.

The action of mud cake is causing failure of cement-squeeze jobs seems to be purely mechanical. Modern drilling muds are formulated specifically to limit loss of water from the mud into the formations being drilled, and are highly effective in this respect. In order for a drilling mud to do this, it must build up on the wall of the hole a dense, impermeable filter cake. Removal of this material from the wall of the hole by mechanical means is very difficult, and the problem has led to the widespread use of "scratchers" of several different types which are welded to the casing as it is run.

Mud cake remaining on the wall of the hole contributes to cement-job failures in three ways; namely (1) actual contamination of the cement by muds; (2) prevention of a strong bond between the cement and the wall of the hole, and, (3) prevention of loss of water from the cement into the formation. The first factor probably is of only minor importance. The last two are more important and are so closely interrelated that separate consideration of either is almost impossible.

Principle of Squeeze Cementing

The basic principle of squeeze cementing is the fact that cement slurry, when placed in contact with a porous material and subjected to a high pressure differential, will lose water to the porous material. With continued application of pressure, more and more water is lost and the cement slurry becomes increasingly dense until, finally, it loses its fluid properties altogether and becomes a very hard, solid material. It thus will be seen that squeeze cementing, as applied to water and gas shutoffs, zone isolation and abandonment, casing-leak repairs, etc., is dependent on the ability of the cement slurry to lose water into the formation against which it is being squeezed.

The pressure differential required to "squeeze" the water out of a cement slurry into a porous medium is largely dependent on the physical characteristics of the porous medium itself (permeability being the most important), and of the cement slurry (weight per gallon, for example). It is generally believed that, under the conditions most frequently encountered on the Gulf Coast, a differential of at least 300 psi. is required.

The presence of a relatively impermeable mud filter cake on the wall of the hole in the section being squeezed will impede and perhaps entirely prevent loss of water from the cement slurry at pressure differentials which otherwise might have been sufficient to bring about such loss had the mud cake not been present. The pressure may then force the still-fluid cement to break open vertical channels along the well bore, and to move considerable distance up or down the hole. Thus a large portion of the cement may be wasted, and that portion of cement remaining in the section in which the squeeze job was attempted may be insufficient to accomplish the desired result.

Effect of Mud Acid

Dowell mud acid, a formula developed especially to meet a specific need of the oil-producing industry, is essentially a hydrochloric acid solution, chemically inhibited to prevent attack on metals, and containing surface-tension reducing agents, emulsion breakers, and an "intensifier" which greatly increases its power of dissolving mud materials, particularly bentonite and allied minerals. Use of this formula for several years has proved its effectiveness in removing drilling mud from oil and gas-producing formations, and in the application discussed here.

Mud acid used ahead of the cement will effectively remove the mud cake from the wall of the hole and leave the face of the formation clean. Its greatest effect will be at the point of its first contact with the formation and, therefore, the cement which follows should begin to lose water at this point. This loss of water causes an increase in the density and viscosity of the cement slurry and, while the cement may still be fluid, higher pump pressures will be necessary to keep it moving. The increase in pressure in turn causes a higher rate of water loss. The process, then, will be seen to be self-limiting.

*Development engineer, Dowell Incorporated, Houston.

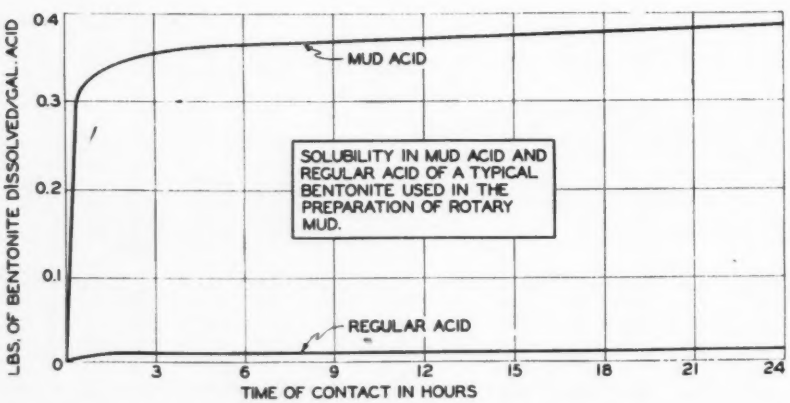
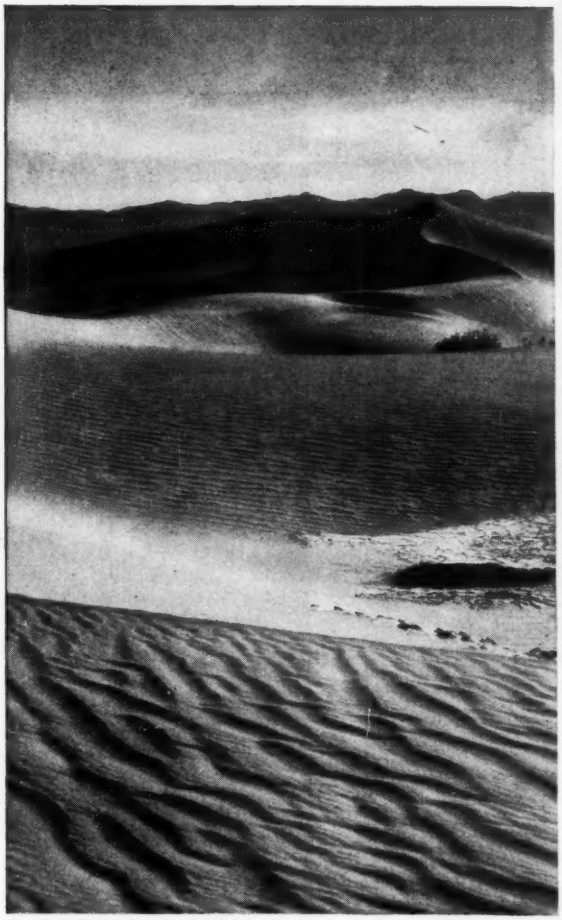


Fig. 1—Comparative effects of mud acid and regular acid



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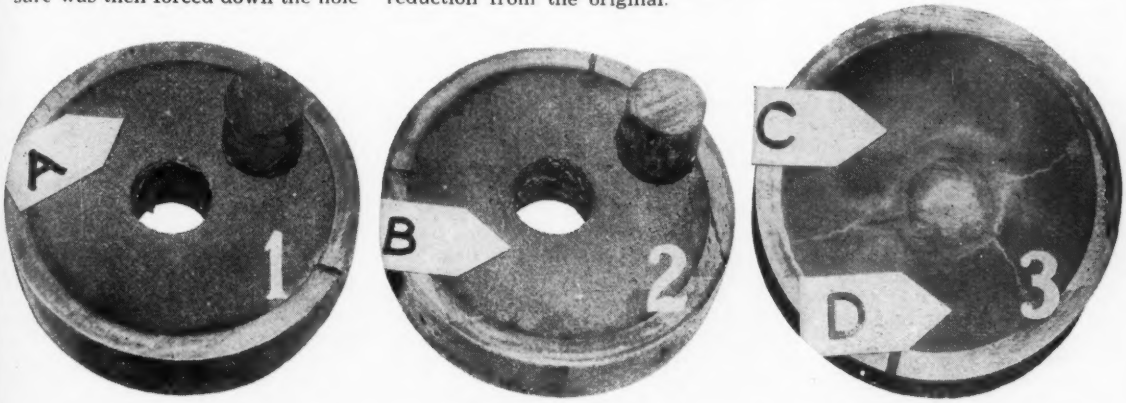
Lab Tests Show Effect of Mud Acid on Mud Cakes

THESE three core tests show effect of water washing versus mud acid, on removal of mud filter cakes. The test apparatus was set up to simulate an actual well completion as closely as possible. High-permeability artificial sandstones were sealed in steel tubes, and a central hole or well bore drilled in the center. Mud under high pressure was then forced down the hole and into the samples, gradually building up a mud cake on the wall.

Core 1.—After the mud cake had been built up in this core sample, water at 100 psi. was pumped into the well bore. An attempt then was made to force a liquid plastic into the well.

When the sample was cut in two for inspection, it was found that the plastic had penetrated the sandstone in only a very few places, those where the mud cake had ruptured. The bond between formation and the plastic was poor. The plastic plug was easily knocked out, showing the nearly intact mud cake. A permeability test taken later at "A" indicated only a slight reduction from the original.

Core 3.—Here mud acid was forced through the mud filter cake and through the sand in the same kind of a test, and liquid plastic then applied to the well. When the sample was cut open, no visible evidence of mud cake remained between the plastic-sand interface, and the plastic was well bonded to the sand. Nearly all the formation had been penetrated by plastic, indicating the degree of filter cake removal by the mud acid and amount of fluid penetration into the sand made possible by application of mud acid. Permeability tests taken later at "C" and "D" showed greatly reduced permeability.



Core 2.—Same procedure was followed, except brine was forced through the core. When the liquid plastic was then pumped in, it again entered the sand only in the few places where the mud cake had ruptured, and the solidified plastic plug did not bond to the formation. A permeability test taken later at "B" indicated very little reduction from the original.

Continued pumping and increased pressure will result eventually in all voids and channels between the outer wall of the casing and the wall of the hole being closed by dense, hard cement from which most of the water has been lost. At this point it will no longer be possible to continue pumping without developing dangerously high pressures. Thus, one of the first requisites of a successful squeeze job, a high final pumping pressure, will have been attained. In addition, better bonding of the squeezed cement to the face of the formation, the outer wall of the casing, and to old cement surfaces will have been brought about by removal of the mud cake. Finally, the greater portion of the cement used probably will have been confined to within a short distance of the "critical" area, as a result of the water loss having been especially facilitated in that area by the use of mud acid.

The technique of using mud acid ahead of cement is relatively simple. With the cement retainer in position and the bypass or circulating joint open, 5 to 10 bbl. of water are pumped into the cementing string. The water then is followed by 500 gal. of mud acid which is, in turn, followed by another 5 to 10 bbl. of water. The water is used ahead of and behind the mud acid for the purpose of isolating the acid from the other fluids in the hole. The last slug of water is followed by the cement.

Well Circulation

In most cases, the well is allowed to circulate until the acid reaches bottom. At this point, circulation is stopped (by setting the retainer, or by closing the bypass or circulating joint) and normal cement-squeeze procedure is followed, until completion of the job.

In long perforated sections it is desirable to lower the retainer to the bottom of the perforations and circulate sufficient acid around bottom to cover the entire perforated section with acid. Following this, the retainer may be raised to the normal position and set. This insures a uniform distribution of acid over the section being squeezed.

BOOKS

HIGH-POLYMER PHYSICS. A Symposium. Edited by Dr. Howard A. Robinson. Published under the auspices of The American Institute of Physics, by Chemical Publishing Co., Inc., Remson Press Division. Brooklyn. 572 pp.

Thirty-nine physicists and chemists, all prominent in their special fields, contributed to this symposium on the relatively new subject of high-polymer physics. The results discussed come largely from industrial research laboratories, rather than from college research groups. Individual articles are devoted to the molecular structure, physical and physicochemical properties of natural and synthetic high polymers, such as glass, cork, rubber, textiles, certain plastics, synthetic resins, and synthetic rubbers. The last part deals with scientific instruments used for making determinations and carrying out tests. Among the properties investigated are the mechanical, electrical, viscosity, dielectric, thermal, elastic, cross-strain, crystallization, tackiness, electrostatic, swelling, and thermodynamic characteristics of certain high polymers. The text is supplemented with numerous tables and illustrations. There is also an extensive bibliography at the end of each chapter.

Pilot Gas-Injection Project Covers Six Leases

*by J. A. Slickers**

STANOLIND OIL & GAS CO. and Landreth et al during the first half of 1948 commenced a six-lease experimental gas-cap injection project in Goldsmith field, to obtain information on this type injection for future full-scale gas-injection programs in limestone - dolomite fields. Two 250-hp. compressors, each serving three leases, are used to inject gas in the gas cap of the six leases located in the southeast portion of the north dome.

Each lease obtains its supply gas from the lease into which the gas is injected. The injection wells are producing oil wells which have been plugged back to the gas-oil contact. The allowables of these wells are reassigned to producing oil wells on the respective leases. Gas injected is credited to all wells producing with a gas-oil ratio above 2,000, starting with the lower-ratio well and progressing to higher-ratio wells. Part of the penalty assessed by high gas-oil ratios is thus removed.

Field and Reservoir Characteristics

Goldsmith field, located in northwestern Ector County, Texas, embraces approximately 30,000 acres. Production is obtained from the San Andres dolomite at an average depth of 4,200 ft. Structure of the field runs northwest-southeast and consists of two domal anticlines, having large gas caps on the crest of these domes.

Original bottom - hole pressure at —1,000 ft. was 1,727 psia. and the bottom-hole sample indicates the original reservoir volume factor was approximately 1.360, and the original solution gas-oil ratio as approximately 757 cu. ft. per bbl. The gravity of the oil ranges from 32° to 37° A.P.I.

The reservoir oil was originally gas saturated, and the field produces under a dual gas-cap and solution-gas drive with the gas cap occupying approximately 30 to 35 per cent of the void space. This type drive reservoir usually yields a high percentage recovery.

The gas produced with the oil is sour, containing about 1,800 grains of sulfur per 100 cu. ft. of gas. An effective water drive does not exist, although a small amount of water is produced, approximately 3 or 4 per cent.

Producing History

There were 13 gas wells and 1,034 oil wells, of which 120 were pumping, as of October 1, 1948. The September 1948 oil production was 754,720 bbl. for an average producing rate of 25,157 bbl. per day. Cumulative oil production to October 1, 1948, was 87,475,350 bbl.

The field gas-oil ratio has been gradually increasing after taking a drop from early conditions. The estimated gas production for the month of September was 2,820,000 M.c.f., yielding an average gas-oil ratio of 3,740 cu. ft. per barrel. The bottom-hole pressure, as in all solution-gas and gas-cap-drive reservoirs, has declined. The arithmetic bottom - hole pressure at —1,000 ft. in April 1948 was 1,105 psig. During the 12-month period ended April 30, 1948, there were 1,000,000 bbl. of oil produced for each 7.7-lb. pressure drop.

On October 1, 1948, the cumulative reservoir withdrawals since the project had been in operation were 1,644,000 bbl., whereas the cumulative volume of injected gas was 169,000 M.c.f. or the equivalent of 347,000 bbl. of reservoir space. This represents approximately 21 per cent of the withdrawals, based on reservoir volume injected.

The Railroad Commission of Texas, on November 1, 1943, reduced the penalized gas-oil ratio from 5,000 to 2,000 cu. ft. per barrel. This, in effect, decreases the allowable of many operators. Various methods were attempted to reduce the ratio by workover or remedial work, which included liners, packers, and squeeze jobs. However, on May 12, 1947, the Railroad Commission granted permission to any operator in Goldsmith field to carry out gas injection for conservation purposes. Thus, by use of an experimental gas-injection project, the penalty gas-oil ratio could be removed by obtaining credit for returning gas to the reservoir.

Operation of Project

The project consists of two compressor plants, each having a double-acting, single - stage, two - cylinder compressor powered by a 250-hp. four - cylinder, gas - burning engine. The auxiliary equipment includes an air compressor for starting, radiator-type water cooler, gas scrubber on intake side of compressor, and a gas-operated electric generating unit. Each compressor is housed by a 22 by 40-ft. steel building.

Gas from the high-pressure separator goes direct to the compressor plants. The gathering pressure averages approximately 345 psig. The minimum injection pressure has been 830 psig., whereas the maximum injection pressure has been 1,080 psig. The average injection pressure has been approximately 960 psig.

The average per-day per-well injection rate through August 1948 was approximately 300 M.c.f., with volumes ranging from a minimum 181 M.c.f. to a maximum of 570 M.c.f. per well per day.

Preparing Injection Wells

Prior to converting a producing well to an injection well, a test of the well is required to determine its 24-hour ability to produce. An oil allowable is then assigned to the well

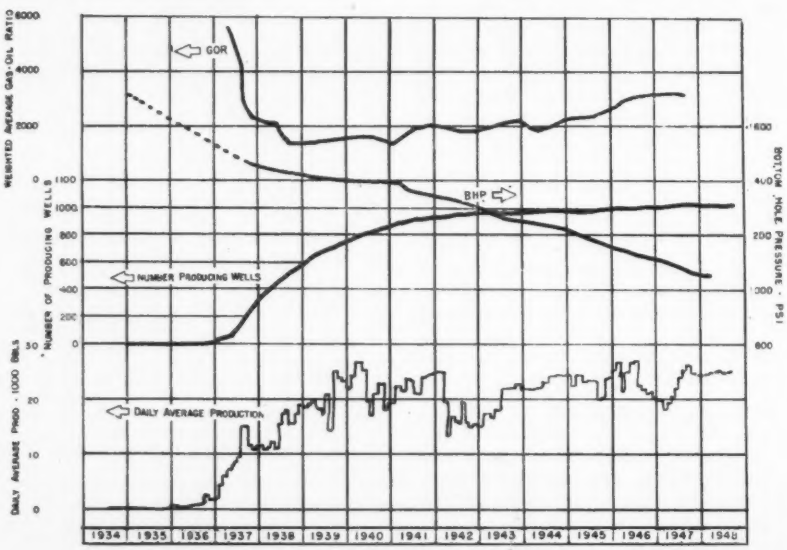


Fig. 1—Performance curve for Goldsmith field, Ector County, Texas

*Stanolind Oil & Gas Co., Fort Worth, Tex. Summarization of paper presented at recent Texas Sections A.I.M.E. meeting, Austin, under title of "Conserving Reservoir Displacement Fluid While Operating an Experimental Gas-Injection Project."

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Since the Railroad Commission order permitted any operator to carry out gas-cap injection, it was necessary to plug back the producing wells to above the gas-oil contact. The following procedure was used:

1. Temperature survey was run to locate the gas-oil contact.
2. Radioactivity log was run to locate the porous and nonporous zones.
3. Spinner permeability survey was run to locate the permeable zones.
4. Formation was washed with 200 gal. of acid to clean the well bore.
5. Well was plugged back with gravel and plastic cap to slightly above the gas-oil contact as determined from the three previous surveys.
6. Permeability profile survey was run to determine if any fluid was lost at the casing seat and to see if the plug back was successful.
7. Tubing was tested for leaks.
8. Production retainer packer was run on the tubing and set in the last joint of the oil string to protect it against high injection pressures.

In selecting an injection well, consideration was given to its productivity, gas-oil ratio, and location on the lease. Also, in selecting the proing wells to which the injection well allowable was transferred, it was desirable to select ones having a low gas-oil ratio and a high enough productivity to make the additional oil. By reassigning the allowable of the injection well an increase in the total allowable is realized. For example, a typical lease had a daily allowable of 102 bbl. before reallocation of the injection well allowable, and 122 bbl. after the production has been transferred.

The method devised to apply the gas injection credits also had to be dependent on the wells producing ability and gas-oil ratio. The gas injected one month is credited to the following month's allowable. The daily average volume of injected gas is credited to wells with a gas-oil ratio in excess of 2,000. The applied gas credits are first assigned to the well with the lowest ratio (above 2,000) and then the next higher ratio, etc., thus utilizing the injected gas to a maximum advantage.

On the lease cited, an increase to 191 bbl. of oil per day is realized by injection of 460 M.c.f. per day, which is a 69-bbl. increase over the 122-bbl.-per-day allowable before gas injected commenced, and 89 bbl. over the 102-bbl.-per-day allowable before the initial reallocation.

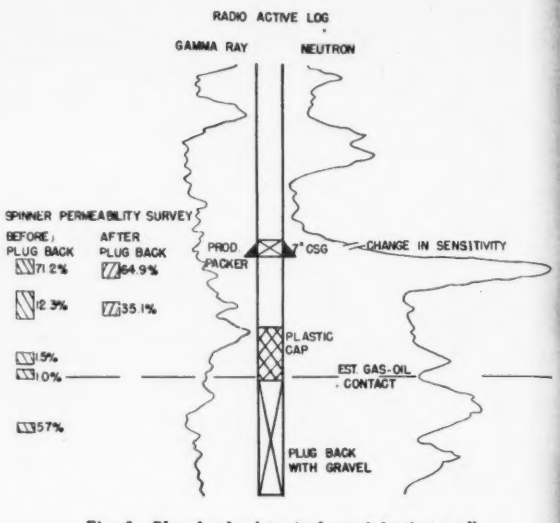


Fig. 3—Plug back of typical gas-injection well

During the month of September 1948 the net increase in allowable obtained from gas injection amounted to approximately 11,200 bbl., and the cumulative increase in allowable to October 1, 1948, amounted to approximately 45,000 bbl. Such an increase bears out the feasibility of an experimental gas-injection project from an economical standpoint.

Reference

1. M. Muskat and M. O. Taylor: Trans. A.I.M.E. (1946) 165, 78.

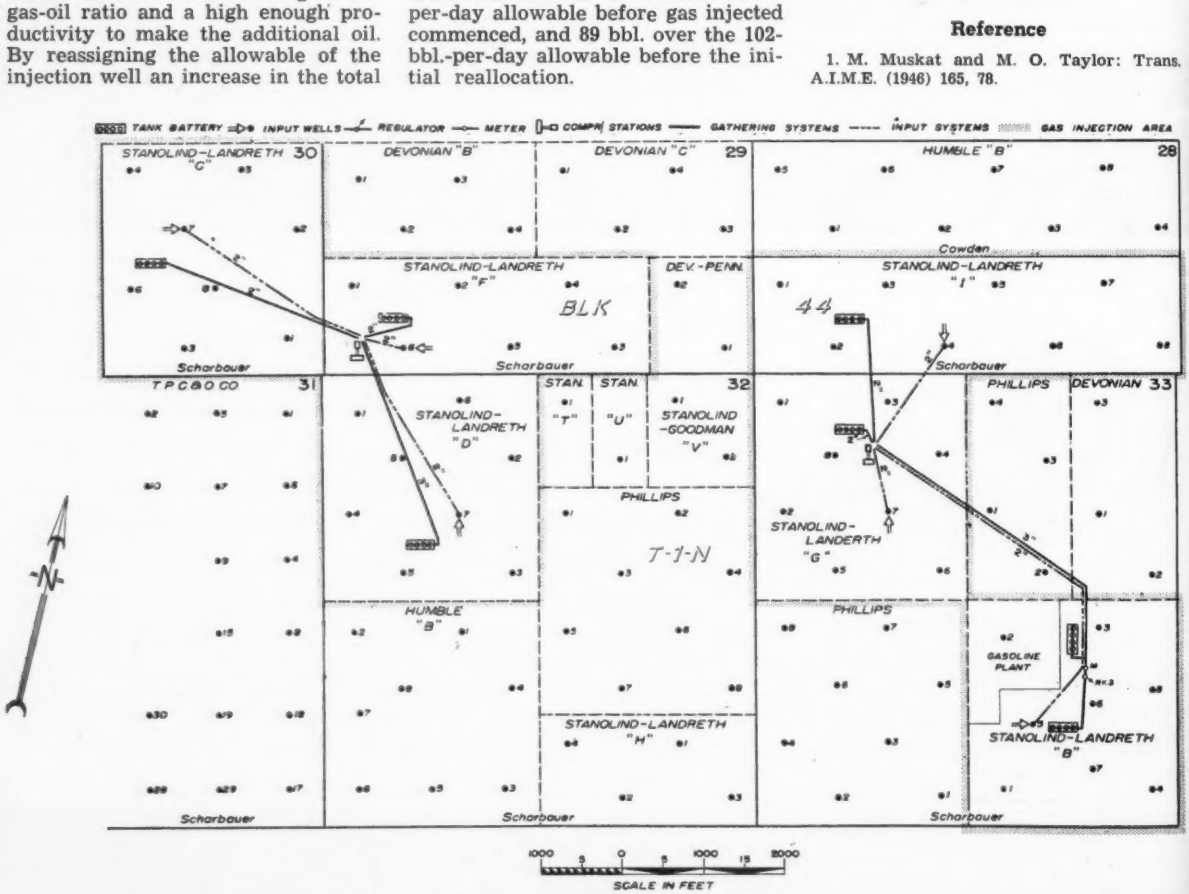
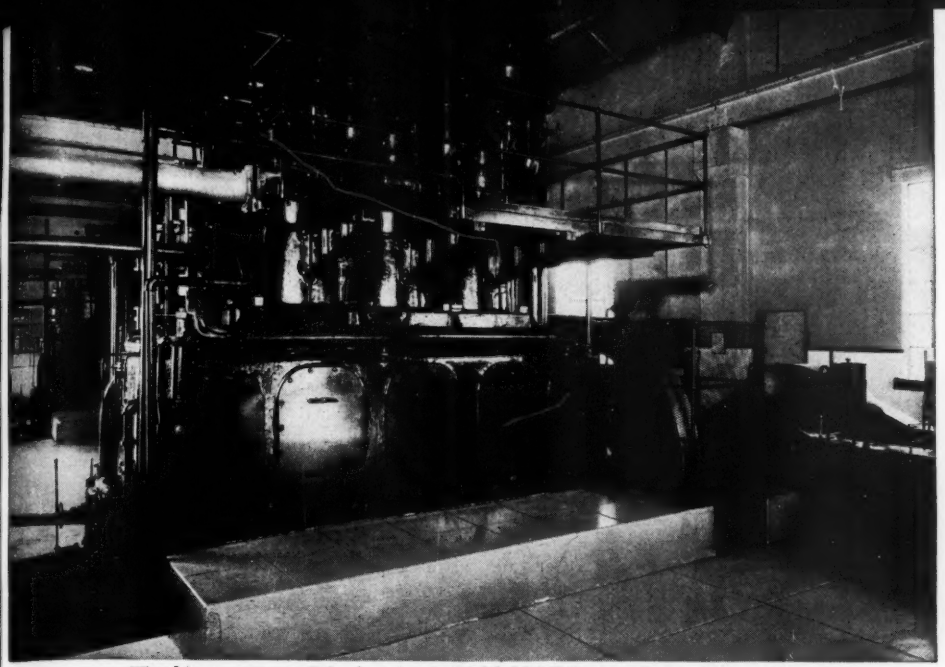


Fig. 2—Gas-injection area in Goldsmith field. Legend appears at top of figure



Worthington 17 x 25 Diesel engine in Richfield Oil Corporation pumping station

How Much Wear Should an Engine Suffer in 23 Years?

In 1924, ten Worthington 17 x 25 3-cylinder air injection Diesel engines were installed on the Richfield Oil Corporation's pipe line from Taft to Wilmington, Calif., to drive pumping equipment.

This 10-inch pipe line extends 127 miles, crossing coastal mountain ranges, and carries crude oil varying from 22 to 32 deg., API, at a rate of 27,000 to 33,000 barrels per day and a discharge pressure of 550 to 700 psi. There are five pumping stations, in each of which are two pumping units. The engines are rated 300 hp at 200 rpm.

The engines were put into operation early in 1925 and have been in virtually continuous service since then. Shutdowns over the 23-year period have been only for routine maintenance.

In 1948, a reconditioning program was begun, involving dismantling to a point permitting inspection of all wearing parts. Of the engines thus far overhauled, the maximum cylinder liner wear encountered was found to be .050 in. The Richfield company considered that with so little wear it would not be necessary to replace the liners or pistons.

Main bearings and Conrod bearings (with the exception of a single Conrod bearing) were found to be in excellent shape and were merely cleaned up and returned to service.

This performance is considered to be extremely good in view of the somewhat unfavorable conditions of cooling water and temperature. At most of the stations there is a scaling problem and it is necessary periodically to remove scale from jackets. Temperature of the water ranges from 80° F in winter to 100° F in summer.

Chemicals From Natural Gas

One of the first plants in the Texas territory to produce chemicals from hydrocarbons obtained from natural gas is Celanese Corporation of America's "Chemcel" Plant at Bishop, Texas.

The photograph shows a view of ten Worthington LTC-8 Angle Compressors, representing a total of 10,000 hp, processing formaldehyde, acetaldehyde, and acetic acid.

These ten compressors are only a portion of the thousands of dollars worth of Worthington equipment in use at the Celanese Corporation's Bishop plant. Among the other Worthington units are four-cycle gas engines, driving water circulating pumps, and between four and five hundred Worthington pumps of various sizes and types. Many of the pumps are "Worthite" Chemical Pumps.

Worthington Angle Compressors at Celanese Corporation's plant in Bishop, Texas

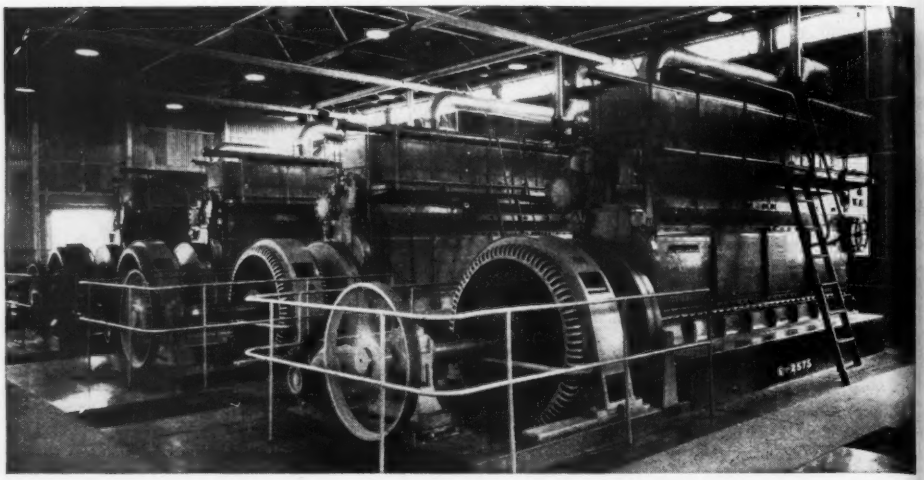
NEWS

FROM THE PETROLEUM FRONT

AS REPORTED BY THE DEVELOPMENT ENGINEERS, FIELD SERVICE REPRESENTATIVES AND CUSTOMERS OF WORTHINGTON

NEWS

from the petroleum front



Worthington natural gas engines for electric power generation.

Much Going on in Notrees, Texas

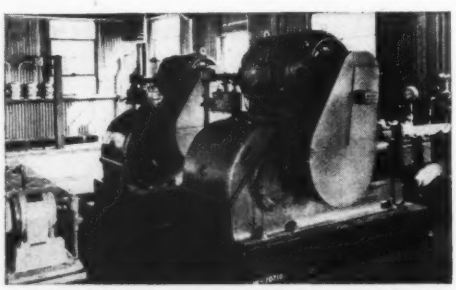
Shell Oil Company's TXL plant at Notrees, Texas, is processing 50,000,000 cu ft of raw gas per day for the purpose of recovering butane, propane and gasoline. There is a large quantity of dry natural gas left as a by-product and this is sold to a natural gas pipe line company for distribution and sale domestically and industrially.

Worthington pumps and gas engines take part in this enormous operation by—

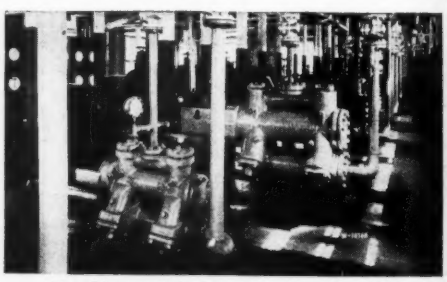
1. pumping finished products through a pipe line from point of storage to point of delivery. Worthington 5 x 10 KMS-1 power pumps are used, discharging against a pressure of 500 psi. Two 4½ x 12 KUF pumps are used when the discharge pressure is expected to near 1000 psi.

2. handling such duties as still reflux service, still transfer service, deethanizer feed, deethanizer reflux, depropanizer reflux, debutanizer reflux and condensate pumping. Worthington Hivol pumps of various sizes are used.

3. providing the power for the plant's entire electric requirements. Four Worthington DDG-8 natural gas engines are used, driving 525 kw generators—all units being derated for 3000 ft altitude.



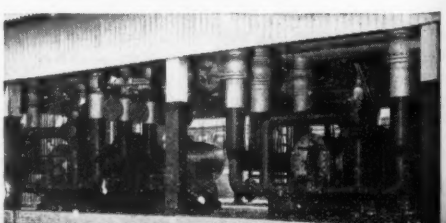
Worthington power pumps at Shell's Notrees plant.



Worthington Hivol pumps on various duties.

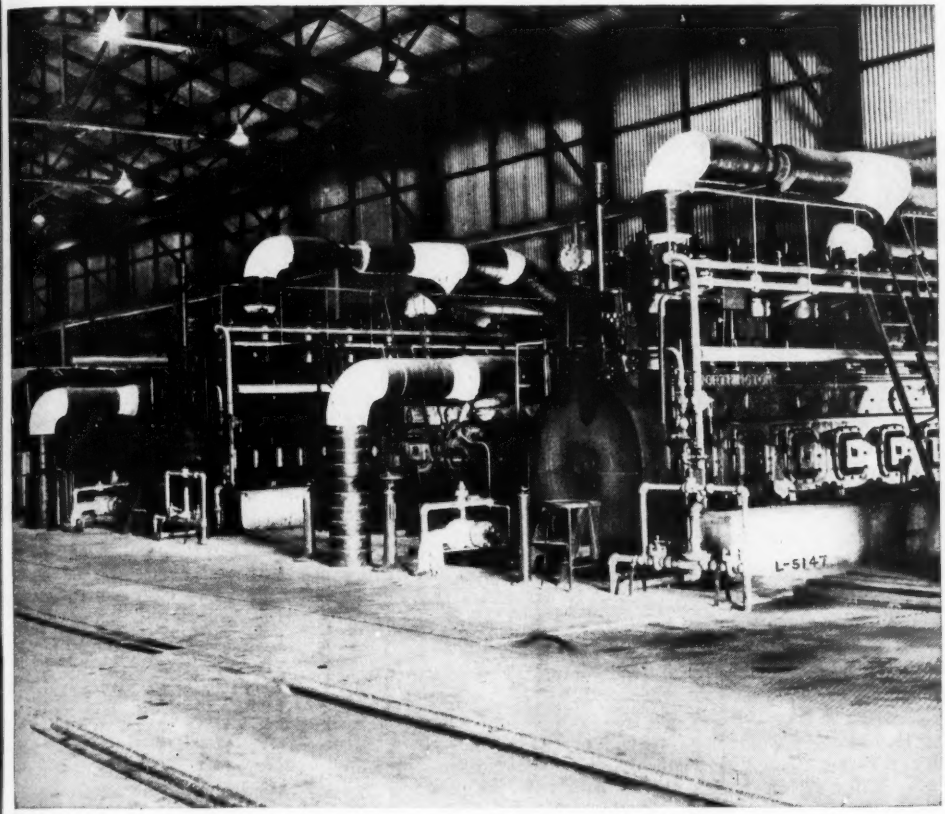
Loading Cargo at 5,000 GPM

At the Union Oil Company's Oleum Refinery in California, two Worthington No. 12 GR Rotary Pumps with 450 hp motors and gears, are pumping over 5,000 gallons of fuel oil per minute, from elevated storage tanks down to the tankers at the docks. The pumps are handling grades of fuel oil up to No. 6.



Worthington Pumps loading cargo at Union Oil Company's Oleum Refinery. →

petroleum NEWS



Worthington Angle Gas Engine Compressors at Lion Oil Co.

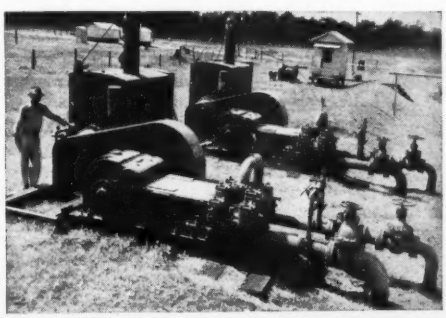
War Veterans Still Operating Near Full Load

Five Worthington Ammonia Refrigeration Machines, and six Worthington Air Compressors, installed in February, 1942, at a plant then operated by Ozark Ordnance Works, are still running at near full load at the same plant, now owned by Lion Oil Company, Chemical Division, at El Dorado, Arkansas.

This plant, possessor of an exceptionally fine war production record, continues to operate at its efficient wartime peak, producing anhydrous ammonia and nitric acid.

The Ammonia Compressors are 2/2/13/13 x 15, compressing NH_3. The Air Compressors are 29½/29½/19½/19½ x 15. Two additional ammonia compressors are on order for a plant expansion program now under way.

Pressure Application



Two Worthington 5½ x 10 in. pumps being used on a pressure application in a Southwest refinery, pumping oil to the main line.

8-13

Worthington Pump and Machinery Corporation

Harrison, N. J

3

Analysis of

MINERAL WATERS

Part 2

by L. C. Case* and D. M. Riggin*

This and the previous article (December 23, page 72) present methods and procedures found most satisfactory through long experience. The material forms a basis of standardization, and also is working manual for newcomers in this field of oil laboratory work.

Determination of Sulfate
(Turbidimetric Method)

THIS method is highly desirable because it combines speed and accuracy. The instrument used is the Fisher electrophotometer, although the method undoubtedly could be adapted to other instruments employing a similar operating principle. General directions for use of the instrument may be found in the manual supplied with it. Directions following show adaptation of the instrument to sulfate measurement.

Solutions required:

1. Na_2SO_4—1 ml. = 1 mg. of SO_4: 2.9576 g. Na_2SO_4/2 l.
2. $BaCl_2$—10 per cent solution.
3. HCl—1:1.

Calibration.—Prepare 10 solutions in 200-ml. graduated cylinders using from 0 to 20 ml. of standard Na_2SO_4. To each cylinder, add 1 teaspoon NaCl and dilute to 200-ml. mark with distilled water. Add 3 drops 1:1 HCl and agitate by inverting cylinder several times until salt is dissolved. Add 1 g. (approx.) of 20-30 mesh $BaCl_2$ crystals. This $BaCl_2$ is furnished by most chemical supply houses and is intended for use in the Parr calorimeter. Rather than weigh 1 g. of $BaCl_2$ crystals, a measure of convenient size may be used. Following addition of $BaCl_2$ crystals, the cylinders are again agitated until all crystals are dissolved. The solutions are allowed to stand 10 minutes.

Determine the electrophotometer scale "A" reading after the initial null adjustment has been made using distilled water as the "blank" in the reference cell, blue filter and 23 ml. cylindrical cells. Each cylinder is agitated just before placing the solution in the small cell.

Plot results on linear graph paper, plotting scale "A" reading on the ordinate and mg./l. SO_4 on the abscissa.

Analysis.—By qualitative inspection, using equal quantities of the water to be analyzed and 10 per cent $BaCl_2$ solution in a test tube, choose the size sample to contain 20 mg. or less of SO_4. This is done in order to make all readings fall within the range of the calibration curve. A little practice is necessary in order to choose the correct amount the first attempt.

Having chosen the correct amount of the sample to be analyzed, pipette this amount into the 200-ml. graduate and proceed as in the calibration of the instrument. If too large a sample was taken, and the reading does not fall within the limits of the calibration curve, a smaller aliquot must be taken. Any amount of brine up to 200 ml. may be used.

In the case where large aliquots of concentrated brines are taken for analysis, the sodium chloride is omitted since it will not dissolve.

Find mg./l. SO_4 corresponding to scale "A" readings from the calibration curve and multiply by proper factor depending on size aliquot taken. Thus, when a 10-ml. aliquot is used,

$$\frac{\text{mg. of } SO_4 \text{ (from curve)} \times 1{,}000}{10} = \text{mg./l. } SO_4$$

In the case of turbid or colored samples, a high reading is obtained unless a blank determination is made. This is done as follows:

Prepare the sample in the same manner as above, omitting the $BaCl_2$ crystals.

The sample is placed in the electrophotometer and a reading taken. Pour the sample back into the graduate and add the $BaCl_2$ crystals, agitate, and allow to stand 10 minutes and again take a reading. The mg. of SO_4 from the final reading minus the apparent mg. SO_4 from the blank run is equivalent to true mg. of SO_4.

Determination of Sulfate
(Gravimetric Method)

Under certain circumstances it becomes necessary or advisable to determine sulfate gravimetrically. Published methods generally do not give adequate space to proper removal of interfering substances. The preparation of samples of strong brines for sulfate precipitation should be done in strict accordance with the following method to assure dependable accuracy in results.

A sufficient sample is taken to contain approximately 50 mg. of SO_4. Ten ml. of concentrated HCl are added and the solution is evaporated to dryness and baked on an asbestos plate over a burner for 30 minutes. The residue is moistened with 10 ml. concentrated HCl, water is added in sufficient quantity to dissolve soluble salts, the solution is heated to boiling, and filtered. The precipitate, consisting principally of silica, is washed with hot water and rejected. The filtrate and washings from the silica separation are heated to boiling in the presence of 10 ml. of saturated bromine water and boiled until all bromine is expelled. This insures complete oxidation of iron.* The solution is cooled and made strongly ammoniacal to precipitate iron. Cooling the solution, together with making it strongly ammoniacal, prevents precipitation of basic ferric sulfate which would give a low sulfate figure.[2,3] The solution is filtered and the precipitate washed with warm water. The filtrate and washings from the iron precipitation are made just acid to methyl orange with HCl, then 1 ml. concentrated HCl is added in excess. The solution is diluted to 300-350 ml. and brought to boiling. Ten milliliters of hot 10 per cent $BaCl_2$ solution are added dropwise. Boiling is continued for several minutes. The precipitate is allowed to settle overnight, filtered through a retentive paper, washed with hot water until free from chloride, and ignited with free access to air until white.

Choice of Aliquot for Analysis of Metallic Ions

Having determined the specific gravity and corrected it to 60° F. in accordance with previous directions, the size sample for calcium and magnesium analysis is selected from Table 4.†

TABLE 4

Sp. gr. at 60° F.—	Aliquot, ml.	Factor
1.000-1.003 inclusive	250	4
1.004-1.012 inclusive	100	10
1.013-1.030 inclusive	50	20
1.031-1.040 inclusive	20	50
1.041-1.070 inclusive	10	100
1.071-1.135 inclusive	5	200
1.136-1.180 inclusive	2	500
1.181-	1	1,000

Dilutions should be made for all quantities less than 2 ml. and for other aliquots if desired, as described under "Determination of Total Chloride."

Determination of Calcium

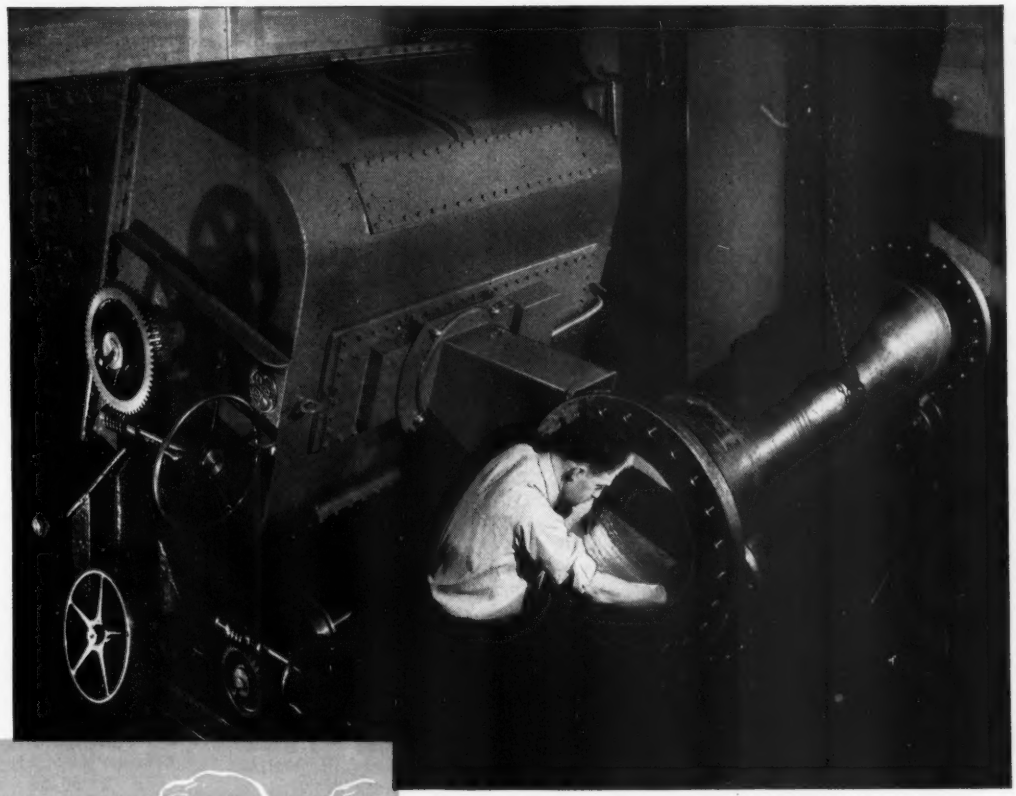
Reagents required:

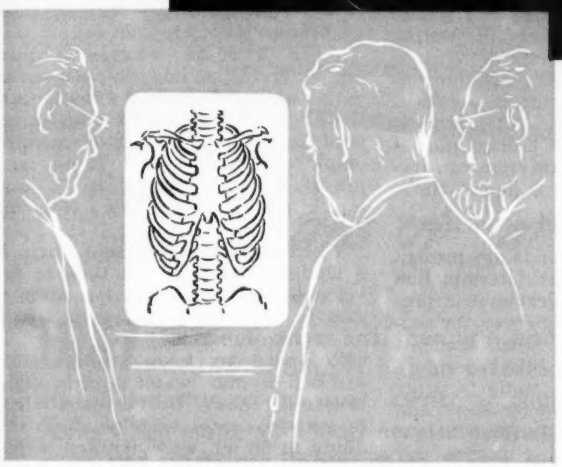
1. Nitric acid—concentrated.

*Gulf Oil Corp., Tulsa

*HNO_3 should not be used for oxidation of iron since nitrate may be occluded in the final $BaSO_4$ precipitate.

†Revised from "A System of Analysis for Oil-Field Waters."[1]





Inspection of Alloy Piping

requires skilled specialists, too

Inspection of prefabricated alloy piping requires specialists as skilled in their jobs as the experienced medical specialist.

Alloy piping inspection must make sure that: (1) Welds are sound and pressure tight; (2) Thinning of pipe wall in bends is avoided; (3) Metal has not deteriorated in fabrication; and (4) All metallurgical and physical specifications have been complied with. Strength tests, metallurgical examination, chemical analysis, radiographic examination for internal flaws, magnetic flux tests for surface defects, fluorescent penetration inspection . . . these are some of the tests often required to determine that the job is right.

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2. Ammonium hydroxide—concentrated.

3. Bromine water—saturated solution.

4. Ammonium chloride—crystals.

5. Ammonium oxalate — saturated solution.

6. H_2SO_4 solution—1:4.

7. $KMnO_4$—0.1 N. (approx) Standardize against sodium oxalate.

8. Sodium oxalate—special powder for standardizing according to Sorensen—dry 1 hour at 130° F.

To the proper aliquot selected from Table 4 are added several drops of nitric acid to oxidize any iron present. The sample is diluted to approximately 100 ml., if necessary, and roughly 1 g. of NH_4Cl is added as a buffer to prevent magnesium precipitation when the solution is subsequently made ammoniacal. The sample is boiled several minutes and 2 ml. concentrated NH_4OH are added. Iron, aluminum, and most of the silica are precipitated at this point. If the precipitate is at all black or green in color, it indicates incomplete oxidation of iron, in which event the precipitate is redissolved by adding HNO_3 dropwise, followed by addition of 10 ml. bromine water. The solution is boiled and NH_4OH again added until iron is precipitated.

Since the estimation of calcium is a volumetric procedure, the presence of a slight precipitate does not warrant its removal before precipitating calcium, any iron present being in the ferric state. If the precipitate is copious, the solution should be boiled a few minutes to coagulate the precipitated hydroxides and, after allowing a few minutes to settle, filtered through a loose filter paper and washed with hot water. The precipitate is discarded.

The combined filtrate and washings from the above filtration or the solution following addition of ammonia if not filtered, is heated to boiling and 20 ml. of a saturated ammonium oxalate solution added dropwise. The solution is boiled several minutes and kept warm at least an hour or longer if the precipitate has not settled. The solution is filtered through a medium retentive paper and washed with hot water 10 times. The filtrate and washings are reserved for magnesium determination.

The filter paper containing the precipitated calcium oxalate is pierced while on the funnel and the precipitate is washed into the beaker in which the precipitation was made, first with hot water, then with 25 ml. of hot 1:4 H_2SO_4, followed by several washes with more hot water. The resulting solution is diluted to 100-150 ml. and titrated to a faint pink using standard $KMnO_4$. The permanganate titer × Ca factor (mg. Ca per ml. $KMnO_4$) × proper factor from Table 4 gives concentration of Ca in mg./l.

In the event of special problems on unusual waters, the standard references on quantitative analysis should be consulted for complete discussion on interfering substances such as phosphates, Ba or Sr.

Determination of Magnesium

Reagents required:

1. Sodium ammonium phosphate—saturated solution.

2. Ammonium hydroxide — concentrated.

3. Ammonium hydroxide—solution 1:9.

To the filtrate and washings from the calcium precipitate, which by now should be relatively free from interfering ions are added 10 ml. of sodium ammonium phosphate solution. The solution is cooled to room temperature and 8 ml. of concentrated NH_4OH are added with constant stirring. The precipitate is allowed to settle overnight, then filtered through a medium retentive filter paper and washed 12 times with dilute (1:9) NH_4OH.

The filter paper and contents are ignited in a weighed crucible, starting with the muffle cold and bringing it finally to full red heat. Ignition converts the magnesium ammonium phosphate precipitate to magnesium pyrophosphate, $Mg_2P_2O_7$, which is weighed. The gravimetric factor $2\,Mg/Mg_2P_2O_7 = .2184$ and the weight of $Mg_2P_2O_7$ in milligrams × .2184 × proper factor (Table 4) gives the concentration of magnesium in mg./l.

For very rapid work, if the magnesium solution after the precipitation is cooled in ice water, filtration can frequently be made in 2 hours' time.[4]

Determination of Silica and Iron

When these compounds are present in large amounts and determination is desired, standard gravimetric procedure is employed. However, for routine determination of small amounts of these substances, this laboratory employs colorimetric methods using the Fisher electrophotometer and methods which are described below. It should be pointed out that this method determines silica in solution.[5] Thus, it should be calculated as silicate ion (SiO_3) when making hypothetical combinations.

Electrophotometer Method for Determination of Silica in Water

Solutions required:

1. Ammonium molybdate solution. Dissolve 10 g. of $(NH_4)_6Mo_7O_{24} \cdot 4H_2O$ per 100 ml. of distilled water. May be warmed on a water bath but never over direct flame. **Store in Pyrex.**

2. Hydrochloric acid—1:1.

3. Oxalic acid solution. Dissolve 10 g. of $C_2H_2O_4 \cdot 2H_2O$ per 100 ml. of distilled water. **Store in Pyrex.**

4. Potassium chromate standard. Dissolve 0.63 g. K_2CrO_4 per liter of distilled water.

5. Sodium tetraborate—1 per cent solution.

Calibration:

Prepare seven solutions using standard potassium chromate and sodium tetraborate as follows:

K_2CrO_4, ml.	Distilled H_2O, ml.	$Na_2B_4O_7$, ml.	Equivalent SiO_3, mg./l.*
1.0	27.0	25.0	2
2.0	26.0	25.0	4
3.0	25.0	25.0	6
4.0	24.0	25.0	8
5.0	23.0	25.0	10
7.5	20.5	25.0	15
10.0	18.0	25.0	20

*When 50 ml. of sample are used, together with the reagents indicated in the following procedure to make a total volume of 53 ml. (or 55 ml. if oxalic acid is used).[6]

Determine the electrophotometer scale "A" reading after the initial null adjustment has been made using distilled water as the "blank" in the reference cell, blue filter and rectangular cells.

Plot the results on linear graph paper, plotting scale "A" reading on the ordinate and mg./l. on the abscissa.

Analysis:

If phosphate is known to be absent, the addition of the $C_2H_2O_4$ solution may be omitted. To a 50-ml. clear sample, add in quick succession 2 ml. of $(NH_4)_6Mo_7O_{24}$ solution and 1 ml. 1:1 HCl. After 5 minutes, add 1.5 ml. of $C_2H_2O_4$ solution. Compare colorimetrically with distilled water as in the calibration procedure.

When a 50-ml. sample is used, mg./l. corresponding to scale "A" values obtained are read directly from the graph. When smaller samples are used, an appropriate factor must be employed. Thus, when a 25-ml. sample is used, the factor is "2" and mg./l. is 2 times the value from the graph.

When sulfites are present, there is a tendency for greenish tints to develop in time and their formation is said to be accelerated when tannin or similar substances are present. If off colors occur, take a fresh sample and add bromine water until in slight excess as shown by the color. Boil to remove excess bromine. Cool and dilute to 50 ml. with distilled water. Analyze as above.

Electrophotometer Method for Determination of Total Iron in Water

Solutions required:

1. Standard ferric iron solution—10 mg. Fe per 1. Dissolve .0702 g. of crystallized ferrous ammonium sulfate $[FeSO_4(NH_4)_2SO_4 \cdot 6H_2O]$ in 50 ml. H_2O and 20 ml. concentrated H_2SO_4. Warm the solution and add $KMnO_4$ (0.1 N.) until the iron is completely oxidized as evidenced by the persistence of a faint pink color. Dilute to 1 l.

2. Potassium thiocyanate solution. Two g. dissolved to make 100 ml. of solution.

3. Hydrochloric acid. 1:3 = approximately 3 N.

4. Potassium permanganate. Use 0.1 N. (prepared for Ca).

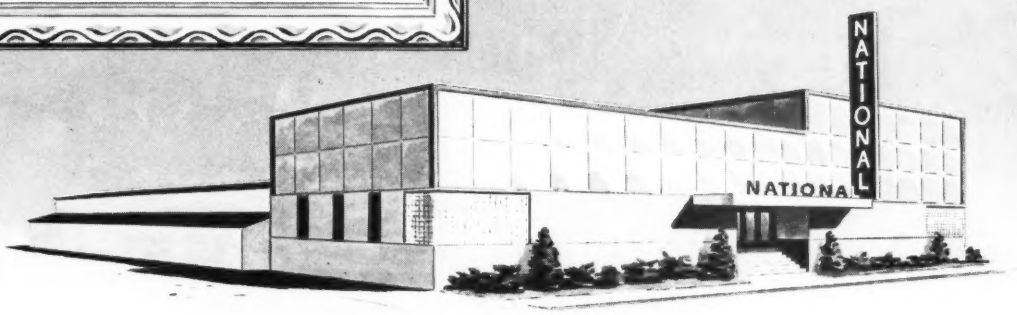
Calibration:

1. Prepare seven solutions in 50-ml. volumetric flasks or graduates using

HE PIONEER STILL IS PIONEERING

IN *Field Service!*

A crude frame building housed the first National Supply Company Store at Cygnet, Ohio, in the Lima-Indiana oil field, thirty miles south of Toledo.



Streamlined and functional, this new National Supply Company Store at Bakersfield, California, stocks virtually everything needed to drill and produce a well.

62 Years of "on the spot" Service

1887: More than a half century ago, National Supply began offering the oil industry on-the-spot service through stores which made vital machinery and equipment and parts available *where* they were needed *when* they were needed. In field after field, The National Supply Company Store was one of the first buildings to go up, and quickly became unofficial "headquarters" for the men working in the field. The Store Manager often lived above the store, "on call" night and day. For his job has *always* been to give quick, competent service to National Supply Company customers.

1949: Since the pioneering days of the oil industry, National Supply has operated stores in every important field. Today approximately 100 stores are in operation. These stores not only stock products made by The National Supply Company, but also bring to drillers and producers countless related products needed in their day-to-day operation. National Supply stores have kept pace both in product and service with the fabulous growth of the oil industry. This is one of the reasons why The National Supply Company is today the world's largest manufacturer *and* distributor of oil field machinery and equipment.

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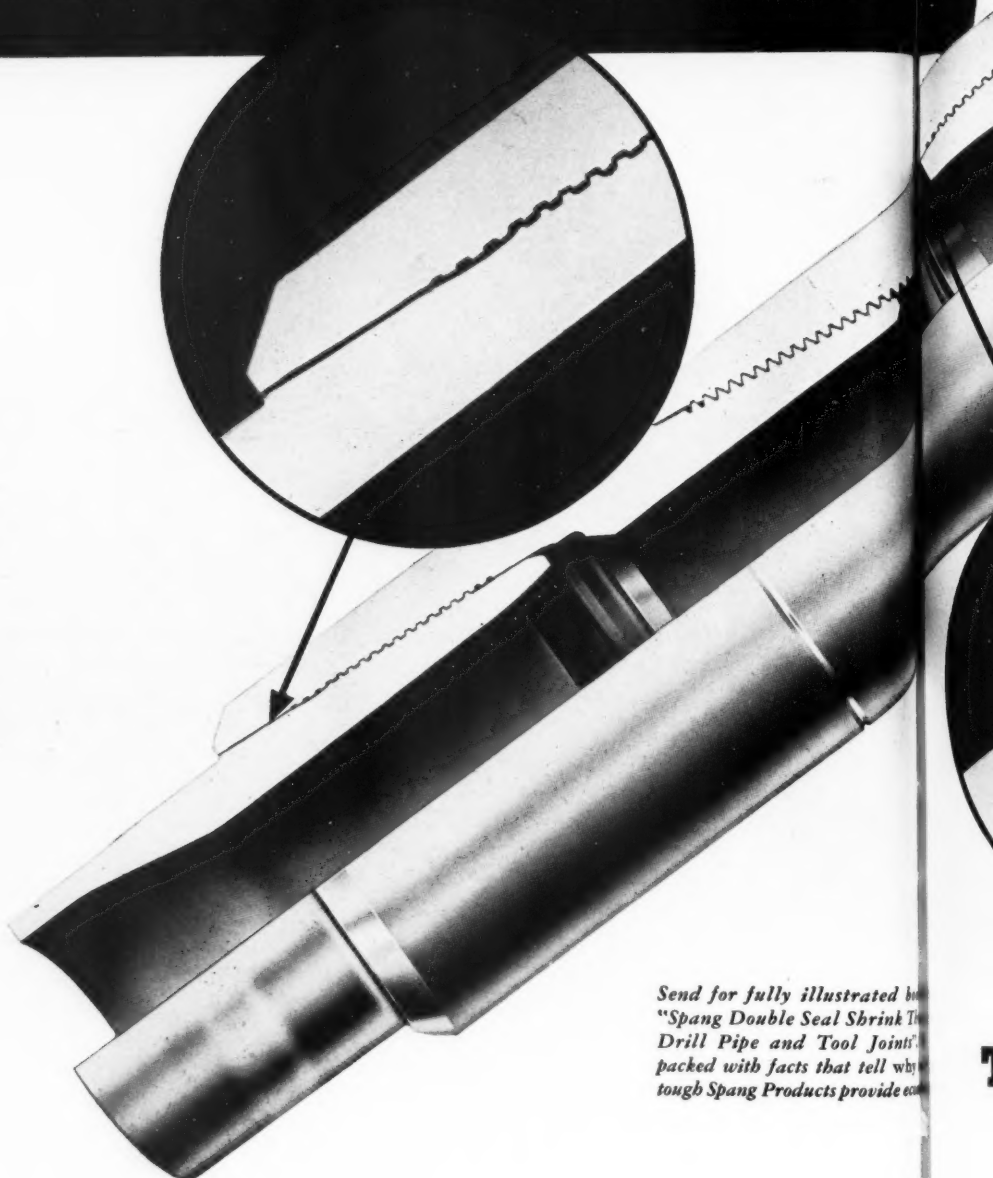

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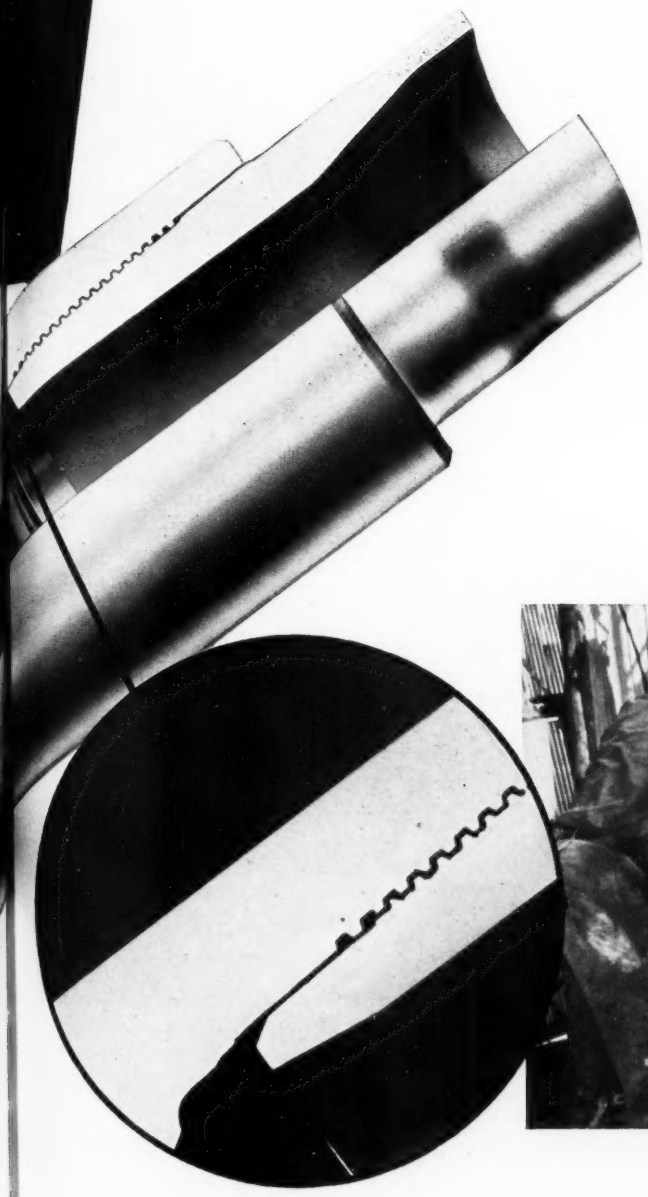

Spang Double Seal Shrink Thread Drill Pipe and Tool Joints are used in all kinds of fields and for many of the deepest wells.

There are some good, down-to-earth reasons for this wide acceptance of Spang Drill Pipe and Tool Joints. They eliminate last engaged thread failures and prevent creepage during drilling. Spang Tool Joints have an *internal* seal that prevents leakage and washout through threads, and an *external* seal that provides positive protection against entry of outside fluids into the threads. And Spang Tool Joints can be replaced right at the rig.

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ETE LINE OF OIL FIELD EQUIPMENT ★ FOR PRODUCTION

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The Superior PTD Diesels are medium speed, 4 cycle engines, *designed and built particularly for drilling service.* They embody outstanding design features which are the logical outgrowth of years of first-hand oil field "know-how".

Here is the logical answer to your heavy-duty power requirements. These Superiors provide abundant power, flexibility, smoothness and rapid acceleration, together with high fuel economy, long life and low upkeep. And they combine moderate weight and easy portability with the extreme ruggedness and stamina necessary to assure continuous 24-hour-a-day service.

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THE INDUSTRY'S MOST COMPLETE LINE OF OIL FIELD EQUIPMENT

standard ferric iron solution and distilled water to contain a range of iron from 0 to 10 as follows:

ml. Std. Fe Sol'n.	ml. Dist. H_2O	mg./l. Fe
50	0	10
40	10	8
30	20	6
20	30	4
10	40	2
5	45	1
0	50	0

2. Pipette 10 ml. of each of the prepared standards into seven 50-ml. volumetric flasks or graduates, respectively.

3. Dilute each to about 40 ml. and add 0.5 ml. 3 N. HCl and 1 or 2 drops $KMnO_4$ solution.

4. Dilute each to mark and mix well.

5. Immediately before running each sample, add 5 ml. KCNS solution and mix well.

6. Determine the electrophotometer scale "A" adjustment after the initial null adjustment has been made using distilled water as the "blank" in the reference cell—blue filter and rectangular cells.

7. Plot the results on linear graph paper, plotting scale "A" reading on the ordinate and mg./l. on the abscissa.

Analysis:

If Fe is appreciable, evaporate 10 ml. or less of the sample to dryness in the presence of 5 to 10 ml. concentrated HCl. Where Fe is very low, use larger volumes in multiples of 10, concentrating by evaporation if necessary. If the sample contains organic matter, destroy by ignition, taking care not to prolong ignition so as to render the iron too difficultly soluble.

Heat the dish to drive off excess acid if the residue was not ignited. Cool the dish and add 1 ml. of 3 N. HCl. Warm, taking care to avoid evaporation to dryness by adding small quantities of distilled water. Rinse hot solution into a 50 ml. volumetric flask or graduate, filtering if necessary.

Add a drop or two of $KMnO_4$ solution; if the color of the permanganate does not persist for at least 5 minutes, add more, drop by drop.

Continue as directed under calibration steps 4 through 6.

When a 10-ml. sample is used, mg./l. corresponding to scale "A" values obtained are read directly from the graph. When smaller samples are used, an appropriate factor must be employed. Thus when a 5-ml. sample is used, the factor is 2 times the value from the graph. If samples larger than 10 ml. are used, readings are divided by the appropriate factor. Thus, if a 20-ml. sample is used, the chart reading is divided by 2.

Determination of pH

When desired, pH measurements are best determined by means of one of the commercial instruments employing the glass electrode. The hydrogen electrode, while more accurate, is of little use for practical application due to its lack of portability and relative fragility. The saturated calomel electrode is the usual reference electrode for pH determination. The standard glass electrode is not suitable for use in strongly alkaline solutions or at high temperatures.

Because of the fugitive nature or instability of compounds, such as CO_2, H_2S, organic acid salts, etc., which have a pronounced effect on pH measurements, the determination should be made as soon after sampling, and with as little aeration, as possible. It is known that, when freshly sampled, most natural waters are clear except for the presence of oil or silt. The presence of any precipitate of iron oxide or alkaline earth carbonates is usually sufficient evidence that the composition of the water has changed sufficiently to make pH determination of doubtful accuracy.

Determination of H_2S

The presence of H_2S is often useful in identifying certain waters. Occasionally, a quantitative estimation is of value as, for example, in corrosion studies. When considered advisable, this determination may be made by the usual iodine method as described in standard quantitative texts. It should be remembered that due to the susceptibility of H_2S to oxidation and its tendency to escape from ordinary sampling vessels, the determination should be made at the source or the H_2S should be "fixed." Fixing involves the precipitation of the H_2S as zinc sulfide by addition of a suitable quantity of zinc acetate solution.[6] The H_2S may be regenerated from the zinc sulfide by the addition of acid when it is desired to make the analysis.

It should be mentioned that iodine-consuming compounds, other than H_2S, may be present in some waters. Soluble sulfides, sulfhydrates, sulfites, and thiosulfates would all consume iodine and lead to erroneous results in the determination of H_2S if their presence were not taken into consideration. The precaution is necessary only when determining small amounts of H_2S, since other iodine-consuming compounds are usually present in amounts of only a few mg./l.

Calculation of Results and Statement of Analysis

It is a common practice to determine essentially all positive ions other than the alkalies and to state these, by difference required to balance negative equivalents, as sodium. This time-saving practice is commendable in most problems encountered. Methods for the calculation appear in many publications and will not be reviewed here. Hypothetical combinations of elements or radicals are seldom desirable. In rare cases where the combined form of statement is justified, the method of the A.P.H.A.[5] should be used. Much remains to be said in discussion of interpretation and comparison of results, also relative significance of various constituents in mineral waters and brines. Such discussion, if reasonably comprehensive, should include countless pages of tabulated data in illustration of problems due to water. Selected literature references are recommended to the interested reader, as well as even more effective experience with water analysis and its related problems.

Practice has shown that it is preferable to record water analyses in ionic form, stated in milligrams per liter. Thus, if specific gravity is given, true parts per million, grains per gallon, pounds per barrel, etc., may be computed at the discretion of those using the analyses for specific purposes. The term "parts per million" has been erroneously used for many years when "milligrams per liter" (mg./l.) was actually intended. The difference is slight with fresh or slightly mineralized waters. However, a brine having total solids of 143,500 mg./l. and specific gravity of 1.100, from Table 2, is shown to have 130,454 p.p.m. total solids after dividing mg./l. by specific gravity. Similarly, if the analysis is stated in mg./l., equivalent combining weights should be stated as "equivalents per liter" (e.p.l.), rather than "equivalents per million" (e.p.m.). Obviously, the latter term is correct only when dissolved solids are given in p.p.m. "Equivalents per liter in per cent" (e.p.l. per cent) is likewise preferred as a more correct and significant term than "e.p.m. per cent" or "reacting value per cent" (r.v. per cent)[7,8] which have had rather wide usage.

The water-analysis record card illustrates a proven method for convenient filing of very large numbers of water analyses.

Space is provided on these 3 by 5-in. cards for all basic information. The cards are filed for ready reference under state or location which should appear in the upper right-hand cor-

(Continued on page 88)

WATER ANALYSIS RECORD

WELL NO. _____ LOCATION _____
DEPTH _____ FORMATION _____

	MGM. PER L.		E.P.L. %
NA		SP. GR., 60°F	
CA		H_2S	
MG		PH	
SO_4		OTHER CONSTITUENTS	
CL			
HCO_3			
CO_3			
TOTAL			

REMARKS _____

LAB NO. _____ DATE OF ANALYSIS _____ ANALYST _____

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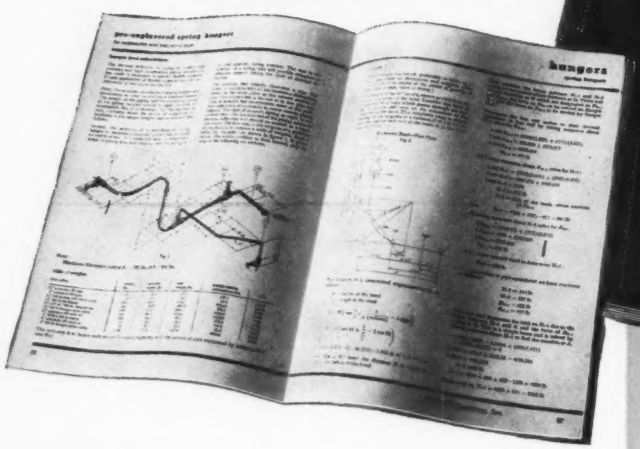

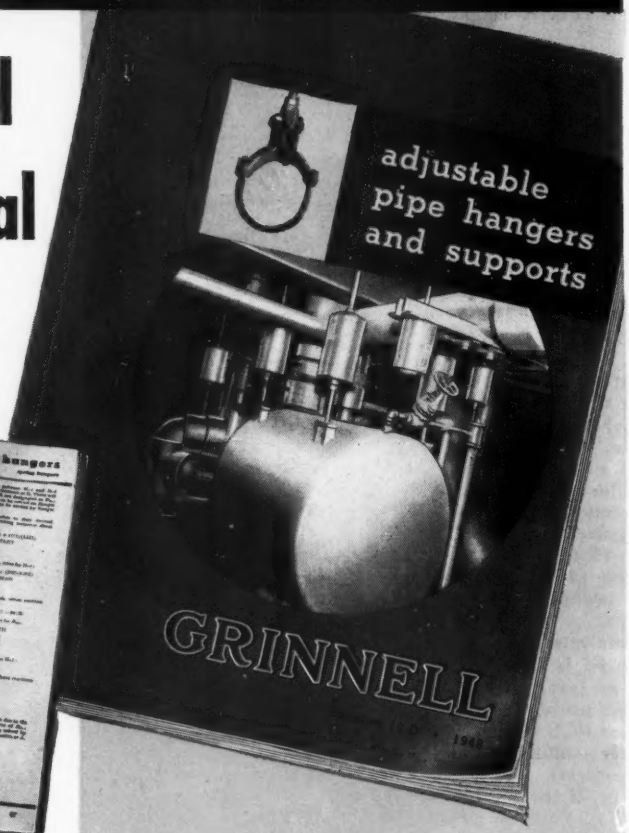

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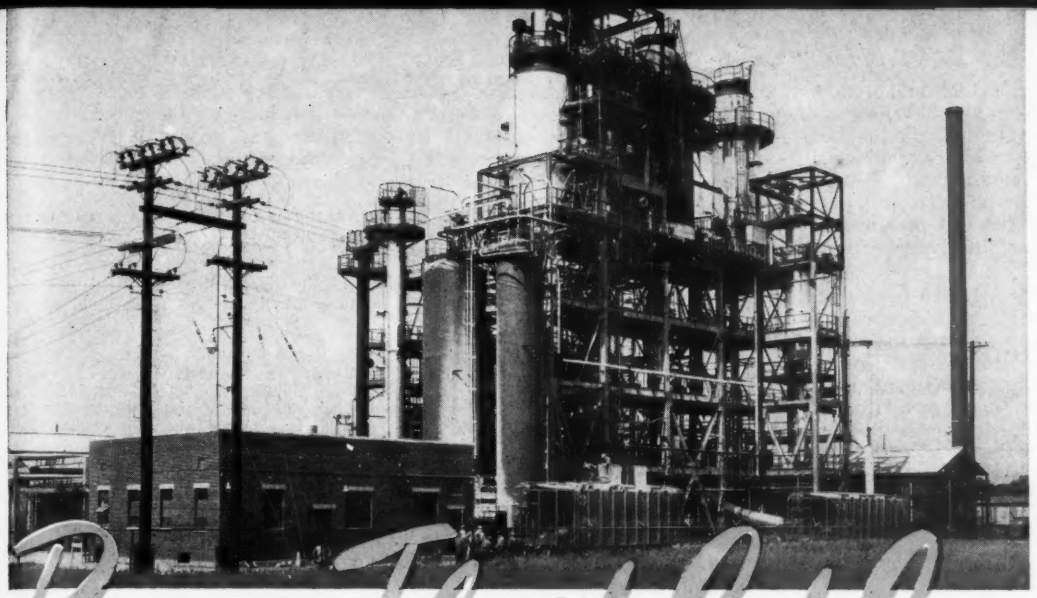


Pure's Fluid Cat Cracker

At Heath, Ohio, Proves Flexible In Initial Period of Operation

by George H. Weber

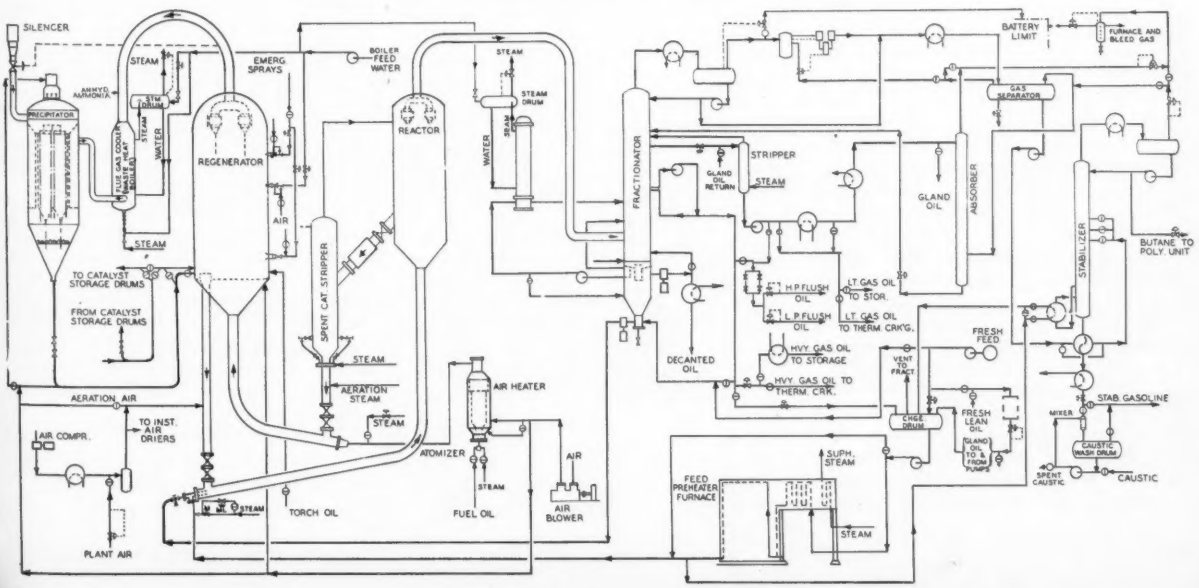
NEARLY 6 months of operation under widely varied conditions have proved the flexibility of Pure Oil Co.'s new fluid catalytic cracking unit at Heath, Ohio. One of the most recent of its type to be placed on stream in this country, the cat cracker was incorporated into the 15,500-bbl. refinery with only moderate adjustments in existing operations. The net result is a marked increase in plant yield of improved-quality gasoline, at a reduction in residual-fuel production.

The unit was designed and constructed by M. W. Kellogg Co. Rated for a once-through capacity of 5,000 bbl. of charge per stream day, it is classed as a small unit.

While the new unit differs from all others in that it is engineered to meet specific requirements at Heath, it incorporates those recent improvements in economy and operation which characterizes other Kellogg fluid catalytic cracking units completed in the past year.

The new "balanced pressure" de-

Equipment and process flow employed in the new cat cracker



sign reduces its height to 110 ft. by means of side-by-side installation of reactor and regenerator on the same platform level. Besides savings in first cost and maintenance, the new design affords simplified piping, lower pressures, and reduced pressure differentials across slide valves in catalyst lines.

A preheater is included in the unit, to increase capacity and improve flexibility. Besides preheating the charge, it provides heat to the stabilizer reboiler in the plant's fractionation section. Other new features of the unit include a spent-catalyst stripper installed outside the reactor, a built-in slurry settler fabricated in the base of the main fractionator, and a cylindrical electrical precipitator.

Conditions of Operation

The fluid catalytic cycle, already familiar in the industry, is illustrated in the accompanying flow chart as used in the new Pure Oil installation. Prepared feed leaves the preheater at 450°-550° F., picks up the hot regenerated catalyst, and enters the reactor at temperatures averaging 900°-910° F. and pressures ranging from 12 to 15 psi. In the top of the 10 by 37-ft. reactor, most of the entrained catalyst is separated from hydrocarbon vapor by cyclone separators. Vapors, with a trace of catalyst fines, pass directly to the main fractionation tower.

Fractionator overhead vapors are partially condensed in the reflux accumulator. Uncondensed product is compressed from the 5-psi. fractionator working pressure to pressures ranging to 300 psi. and charged together with accumulator liquid, to the stabilizer. The stabilizer is designed to serve either as a depropanizer or debutanizer.

Two side streams are withdrawn from the fractionator. The light cycle stock is stripped but the heavy cycle stock is withdrawn from the unit without stripping. Under normal operation both streams are charged without cooling, to thermal cracking units. When required, however, either or both side streams may be cycled to the reactor for further catalytic cracking.

In the base of the fractionator, catalyst which passed cyclone separation in the reactor is concentrated in the slurry settler. Bottoms are returned to the reactor inlet, and a decanted oil stream is withdrawn to storage as a heavy fuel-blending product.

Spent catalyst is continually withdrawn from the reactor to an external stripper where steam removes absorbed hydrocarbons. These recovered vapors are returned to the reactor at a point above the level of the fluidized catalyst bed. Stripped, spent catalyst settles through the stripper standpipe and is admitted through hydraulically controlled slide valves to the air-injection point. From that point the fluidized air-catalyst mixture flows upward to the regenerator where coke deposit is burned from the catalyst at controlled temperatures averaging 1,070° F.

Flue gas, after cyclone separation of most entrained catalyst, is cooled to 450° F. in the waste-heat boiler. Further catalyst is separated in the electrical precipitator before flue gas is exhausted to the atmosphere. Regenerated catalyst moves by gravity through controlled slide valves to the oil-injection point, completing the cycle.

The flue-gas cooler, or waste-heat boiler, together with the cooler circulating fractionator bottoms, generate about 22,000 lb. of steam per hour.

Charging Stock

The 5,000-bbl. unit will be employed primarily on single-pass cracking of a prepared feed stock at a conversion level of 50-53 per cent of fresh charge. Future changes in product demand which might affect the balance of current operations may be met by varying single-pass conversion or by cycling.

At present operation, a uniform charge derived from Illinois and Corning crudes will be processed exclusively. A heavy virgin gas oil from an atmospheric crude unit in the refinery accounts for 33 per cent of the current charge to the catalytic cracker. The remaining 67 per cent comprises a heavy vacuum gas oil derived from a feed-preparation unit designed specifically to provide charging stock for the fluid catalytic unit. The feed-preparation unit takes a 40 per cent reduced crude from a 10,500-bbl. atmospheric crude unit in the refinery. The charge is further reduced to about 9 per cent bottoms by vacuum distillation of the 26°-gravity gas oil showing average vacuum initial and end points of 450° and 1,100° F., respectively. The gas-oil mixture provides a total fresh feed to the catalytic cracker, averaging 28° gravity.

The charge is uniformly sweet, averaging 0.25 per cent sulfur and presenting no unusual corrosion problems. Ultimately, operators plan to process additional reduced crude from another atmospheric unit at the plant, thereby increasing the percentage of vacuum gas oil in the fresh catalytic cracking charge. The feed-preparation unit consists mainly of existing equipment, modified to the new use. Catalytic cracking at Heath reduces thermal cracking, and the furnace from a retired viscosity breaker was converted to use as the feed-preparation heater.

Products

Operation of the new catalytic cracking unit shows the product yields indicated in Table 1 at single pass and about 50 per cent conversion. All data represent average figures, taken during a 15-day test period.

TABLE 1—PRODUCT YIELDS ON SINGLE PASS AND ABOUT 50 PER CENT CONVERSION

Charging stock: Mid-Continent gas-oil mixture, gravity 28° A.P.I., vac. i.p. 440° F., vac. e.p. 1,030° F.

Products:	
Gas (C_4 and lighter), wt. %	6.5
Total butanes, vol. %	8.4
C_5 to 400° e.p. gasoline, vol. %	38.5
Light cycle stock, vol. %	21.2
Heavy cycle stock, vol. %	22.5
Decanted oil, vol. %	3.7
Coke, wt. %	5.1
Product inspections:	
Per cent butenes in total butanes, vol. %	53.0
Stabilized gasoline:	
R.v.p., lb.	5.6
Gravity, °A.P.I.	57.3
Octane numbers:	
A.S.T.M. clear	78.5
A.S.T.M. +1.5 cc. TEL	83.2
C.F.R.R. clear	91.8
C.F.R.R. +1.5 cc. TEL	96.0
Light cycle stock:	
Gravity, °A.P.I.	31.3
I.p., °F.	400
E.p., °F.	600
Heavy cycle stock:	
Gravity, °A.P.I.	27.4
I.p., °F.	350
E.p., °F.	725
Decanted oil:	
Gravity, °A.P.I.	16.7

When all butanes are charged to a polymerization unit an additional 254 bbl. of polymer gasoline can be produced daily, comprising 5.1 volume per cent of fresh feed to the catalytic unit. Normally only these butanes not required for seasonal vapor-pressure control of the total plant gasoline are polymerized. The two cycle stocks are handled separately as explained above, moving direct to thermal cracking units, to storage, or under certain conditions, being cycled as feed stock makeup.

During the first few months of operation the unit has been tested between the two extremes of single pass, and 100 per cent cycling of the heavy cycle stock. Cycling will be employed principally to avoid running out of charging stock when the feed preparation unit is down.

To date a natural catalyst has been used exclusively, although the new unit is designed to operate with both types, natural or synthetic. Catalyst-oil ratios have been varied from 5:1 to 10:1 during test runs, but average about 6.5:1 for normal operation. The unit is designed for a circulation capacity of 300 tons of catalyst per hour. The operating inventory of 70 tons can be accommodated in one large storage vessel and a second, smaller drum is used for storing makeup catalyst.

While the fluid catalytic cracking unit generates 22,000 lb. of steam hourly, it is a net steam consumer,

(Continued on page 88)

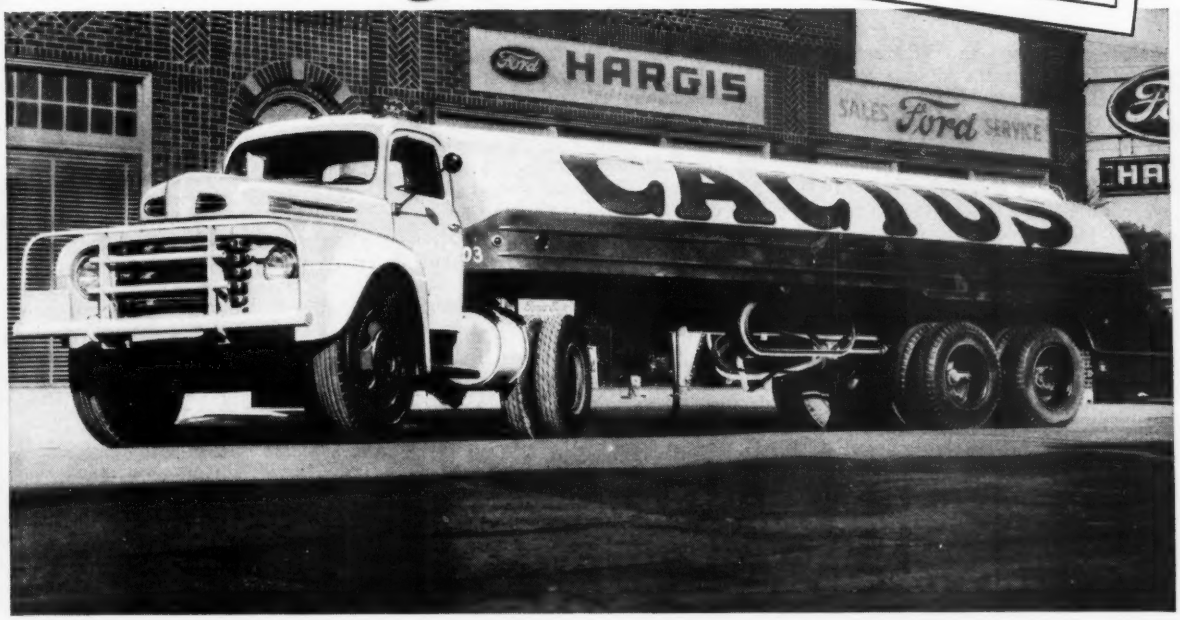
"Our FORD stays in line with tractors costing more"

Roadside Report

FORD Bonus Built TRUCKS

GRADY P. BROWN

HOUSTON, TEXAS



"REGARDING the performance of our F-7 tractor, I can say it has filled the bill in every respect," writes Grady P. Brown whose Ford Truck is engaged in gasoline transport in the Houston, Texas area.

"It is now pulling a 4,835 gallon gasoline transport. Our Ford stays in line with other tractors costing considerably more and with a higher rated capacity."

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- ★ Ford Super Quadrax 2-speed axle with vacuum shift for performance flexibility in Model F-8 (single speed axle also available); single-speed Quadrax Hypoid Axle in Model F-7.
- ★ Large diameter (10-inch) wheel bolt circle with 8 studs to allow for extra-strong hub construction.
- ★ Million Dollar Cab with Ford Exclusive Level Action suspension for greater driving comfort.
- ★ Nationwide service from over 6,400 Ford Dealers.
- ★ Ford Bonus Built construction for long truck life.

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Hugoton . .

World's Largest Dry-Gas Field Is Amazing Development

by C. H. Keplinger,* J. M. Wanemacher,* and K. R. Burns*

THIS article presents a compilation of recent data on the world's largest dry-gas field. Hugoton field, or Guymon-Hugoton, is truly an amazing development. The extent of the field, 150 miles in length by 35 miles in width, partially suggests the immensity of the problems in field development and potential gas reserves. The geographical center of development is Hugoton, Kans., from which the field takes its name.

The field's proven and developed area includes portions of Kansas, Oklahoma, and Texas (see data, by states, Table 1). The approximate productive limits of the field are shown in Fig. 1.

History of Geology

During later Pennsylvanian and Permian geological time periods, this area was a submerged basin. While the area was submerged, limestones and dolomites were deposited which constitute the gas zones of the field. The upper Permian deposits are predominately red beds with inclusions of anhydrite and gypsum. The rocks above the red beds to the surface are undifferentiated continental deposits of Tertiary and Quaternary age.

The gas reservoirs of Hugoton are the dolomite beds of the lower part of the Sumner group plus the dolomite and limestone beds of the upper portion of the Chase group which are encountered at depths varying from 2,400 to 2,900 ft. The Sumner and Chase groups are classified as part of the Big Blue series of the Permian system. The gas pay zones are locally known as Herrington, Krider, Winfield, and Fort Riley.

The structural trend of the reservoir section is that of generally eastward-dipping monocline. The Winfield limestone, for example, is more than 800 ft. above sea level at the west edge of the field and 300 ft. above sea level at the east edge. The field is generally considered a stratigraphic trap with the gas being trapped by the pinching out west and northwest due to the relatively impermeable condition of the formations in their original deposition.

The gas throughout the field is uniformly sweet with the exception of a small area in Hansford and Sherman countries, Texas, with 18 producing wells. The sour-gas sulfur content ranges from 6 to 20 grains per 100 cu. ft. The average B.t.u. value is approximately 1,000 and its variation over the field is shown in Fig. 1.

Virtually all the gas is stripped for L.P.G. or gasoline. The natural gasoline content of the gas is about 0.35 gal. per 1,000 cu. ft. The average analysis of Hugoton gas is as follows:

	Per cent
Methane	74.26
Nitrogen	14.27
Ethane	5.81
Propane	3.52
Butane	1.48
Pentane plus	0.65

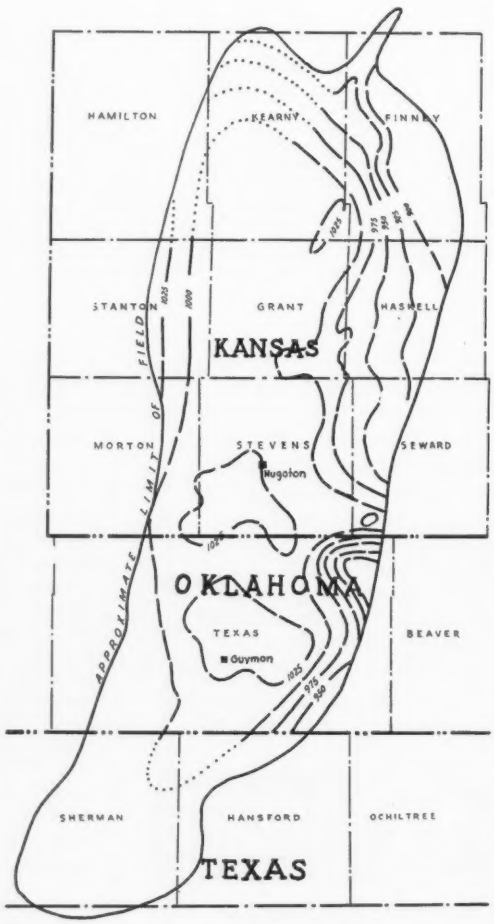
Drilling and Field Practices

Early exploration was done with cable tools. In recent years various drilling programs have been utilized. One practice is to drill with rotary tools from the surface to the top of the first gas zone known as the Herrington dolomite. The Herrington is encountered at a depth of ±2,450 ft. A production string of casing is run and rotary tools moved off. Cable tools are then rigged up to complete the drilling-in operations.

Another practice used in recent years is to complete the well with rotary tools. In this operation the casing program is usually to set 500 or 600 ft. of surface pipe to control freshwater sections and then run a production string of casing to the bottom of the well. By virtue of the above procedure, the casing must be perforated to obtain production. Some operators elect to drill to total depth with rotary tools and "swing" the production string just above the top of the first gas zone. In following the last procedure, open-hole conditions are not altered and a saving of several hundred feet of casing is realized.

In some areas of the field the intervening beds between the gas zones have a tendency to cave in and hamper or actually shut off production. Sometimes the caving problem can be remedied by using tools to clean out the bore hole. With stubborn cave-in problems, the situation can usually be met by running a perforated liner over the entire open-hole area.

In completing the wells, all types of engineering practices and studies are made for each individual well. One rather standard practice is to acidize the various sections before actual completion tests are made. Forty-six wells were completed from



Map of Hugoton gas field. Contours indicate the gross heating value of the natural gas in B.t.u. per cubic foot, as found in the various areas of the 4-million-acre field

*Keplinger & Wanemacher, petroleum and gas consultants, Tulsa.

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The new "Oilwell" Series "RT" Heavy-Duty Rotary Drilling Units with (1) hydraulic torque converter, (2) geared transmission, (3) flexible coupling, (4) air-operated brake, (5) remote hydraulic throttle control, (6) "Oilwell" Rotary, offer a major step forward in the close control of drill-string rotation. These units can be furnished, powered by either GM 6-71 Twin or Waukesha LROU engines.

The geared transmission of this new Series "RT" Unit gives you instant selection of two forward rotary speeds —or reverse for fishing or cleanout work.

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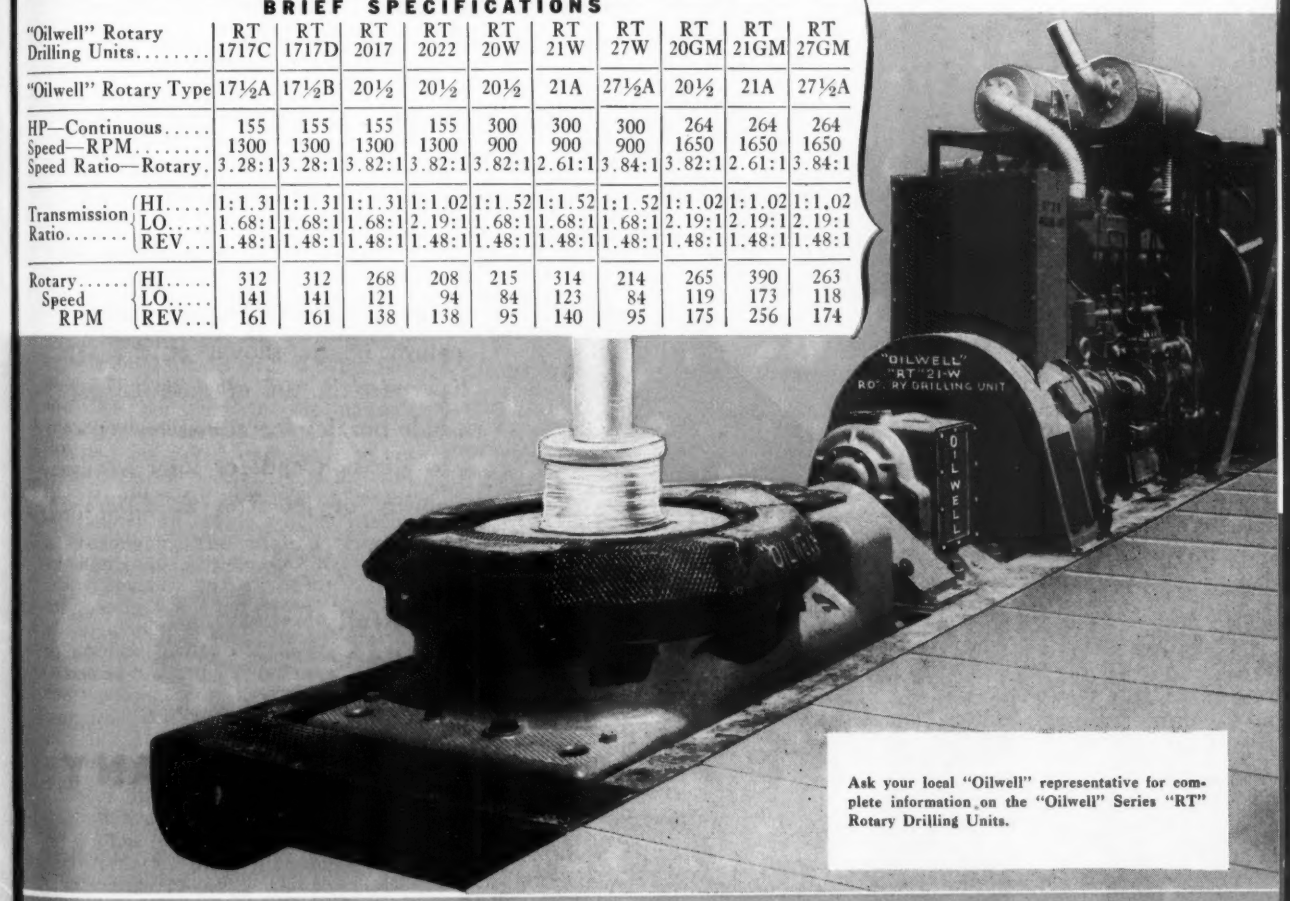
HP—Continuous		155	155	155	155	300	300	300	264	264	264
Speed—RPM		1300	1300	1300	1300	900	900	900	1650	1650	1650
Speed Ratio—Rotary		3.28:1	3.28:1	3.82:1	3.82:1	3.82:1	2.61:1	3.84:1	3.82:1	2.61:1	3.84:1
Transmission Ratio	HI	1:1.31	1:1.31	1:1.31	1:1.02	1:1.52	1:1.52	1:1.52	1:1.02	1:1.02	1:1,02
	LO	1.68:1	1.68:1	1.68:1	2.19:1	1.68:1	1.68:1	1.68:1	2.19:1	2.19:1	2.19:1
	REV	1.48:1	1.48:1	1.48:1	1.48:1	1.48:1	1.48:1	1.48:1	1.48:1	1.48:1	1.48:1
Rotary Speed RPM	HI	312	312	268	208	215	314	214	265	390	263
	LO	141	141	121	94	84	123	84	119	173	118
	REV	161	161	138	138	95	140	95	175	256	174



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HOUSTON 1, TEXAS

THE REED STAMP OF QUALITY

TABLE 1—PROVEN AND DEVELOPED ACREAGE DELIVERABILITY AND PRODUCTION BY STATES—HUGOTON FIELD

State—	Proven acres	Developed acres	Sept. 1948 producing wells	Deliverability M.c.f. Total	Deliverability M.c.f. Per well	Production in M.c.f. at 14.65 lb. Sept. 1948	Production in M.c.f. at 14.65 lb. Cumulative 10-1-48
Kansas	2,823,300	731,520	1,112	2,047,184	1,855	13,239,539	984,436,621
Per cent of total	62	29	55.6	.....	....	.....	.....
Oklahoma	933,760	430,480	659	2,437,132	3,685	8,779,623	466,172,040
Per cent of total	23	45	32.8	.....	....	.....	.....
Texas	613,760	149,760	232	820,000	3,530	5,310,999	128,462,405
Per cent of total	15	28	11.6	(Est.)	....	.....	.....
Total	4,070,820	1,311,760	2,003	5,304,316	....	27,330,163	1,579,098,866

September 10 to October 1 this year and all but two wells were acidized. In the 44 wells which were acidized, a total of 902,700 gal. of acid were used, making an average gallonage of 20,516 gal. per well. Acid in such large quantities is usually placed in the well in stages, i.e., first stage, 5,000 gal. and, second stage 15,000 gal. Remarkable work has been accomplished in isolating each producing zone and selectively acidizing each zone.

The rock pressure of the field is subnormal. The initial pressure of 440 psi. was recorded in several early wells. From the allowable schedules, the present pressures range from 322 to 435 psi.: Kansas, 334 to 435; Oklahoma, 340 to 428, and Texas, 322 to 424.

There are 46 different operators in the field. Phillips Petroleum Co. has the greatest number of wells—a total of 355. The next six largest well owners are: Republic Natural Gas Co., 322 wells; Cities Service Gas Co., 140; United Producing Co., 126; Columbian Fuel Corp., 105; Harrington & Marsh, 103; Northern Natural Gas Co., 101.

Gas Reserves

The original gas-reserve estimates vary from 22 to 29 trillion cubic feet for the entire field. This represents over 15 per cent of the nation's known gas reserve.

Based on calculating gas reserves on a pressure base of 14.65 lb. with an abandonment pressure of 25 lb., we believe an estimate of 29 trillion is reasonable. The original reserves by states are as follows:

	Original gas reserve (cu. ft.)	Per cent of total
Kansas	15.0 trillion	51.7
Oklahoma	8.5 trillion	29.3
Texas	5.5 trillion	19.0
Total	29.0 trillion	100.0

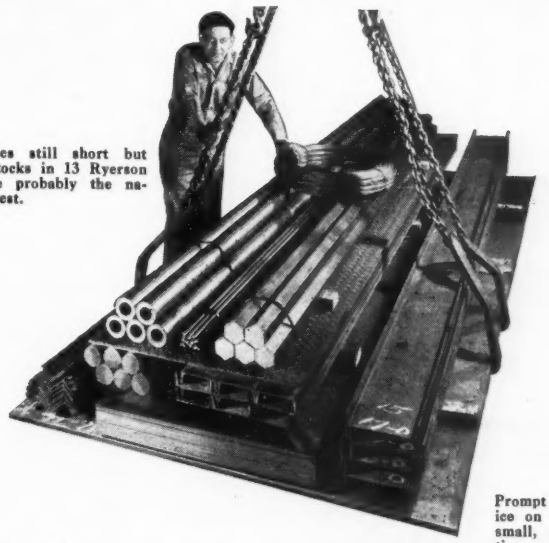
Purchasing and Transportation

The major portion of the gas production from Hugoton is taken by pipe lines to markets. Locally the carbon-black plants consume approximately 10 per cent of the allowable. In Kansas, the largest purchasing company is Northern Natural. Its September 1948 purchases amounted to 4,844,349 M.c.f. Cities Service Gas is the largest purchaser in Oklahoma, with September 1948 purchase of 5,716,395 M.c.f. It is also the largest purchaser in the field. Phillips Petroleum is the largest purchaser in Texas with a September 1948 purchase of 3,439,573 M.c.f. Phillips' total purchases in Texas and Oklahoma amounted to 5,350,388 M.c.f.

Hugoton gas is marketed locally in Kansas, Oklahoma, and Texas, and long-distance transmission pipe lines carry gas as far east as Illinois, Michigan, and Ohio; north to Nebraska, Iowa, South Dakota, and Minnesota; and west to Colorado and Wyoming.

There are several gasoline plants located in or near the field which extract the natural gasoline and dehydrate the gas for pipe-line transmission. Peerless, Columbian Carbon

Steel for Oil & Gas Industry



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STAINLESS — Allegheny metal sheets, plates, bars, tubes, pipe, etc.
ALLOY STEEL—many types—as rolled, annealed, heat treated
REINFORCING—bars & accessories, wire mesh, etc.
BABBITT—and phenolic laminated bearing material
MACHINERY & TOOLS—metal working & boiler shop

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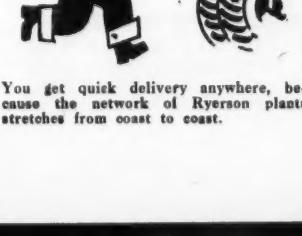
Accurate cutting to your order is assured by modern Ryerson equipment.



You get quick delivery anywhere, because the network of Ryerson plants stretches from coast to coast.

RYERSON

and United Carbon each operate carbon-black plants near Hickok, Kans. Cabot Carbon operates two plants at Guymon, Okla.; one is a furnace-black plant, and the other is channel-black-process plant.

Analysis of Mineral Waters

(Continued from page 79)

ner. Diagnostic information appears at either end so that a great many cards may be compared in a small space, or copied for other purposes, merely by stacking cards with one end of each in view. Additional, less-often determined constituents may be entered toward the center of the card. Pertinent sampling data should be included under "Remarks." Other calculation or interpretation of the basic data may be entered on the back of the card.

References

1. Reistle, C. E., and Lane, E. C.—"A System of Analysis for Oil-Field Waters." U. S. Bureau of Mines Tech. Paper 432, p. 4, 1928.
2. Low, Albert H.—"Technical Methods of Ore Analysis," 8th Ed., p. 240, John Wiley & Sons, New York, 1919.
3. Scott, Wilfred W.—"Standard Methods of Chemical Analysis," 5th Ed., Vol. 1, p. 907. D. Van Nostrand Co., Inc., New York, 1944.
4. Scott, Wilfred W.—"Standard Methods of Chemical Analysis," 5th Ed., Vol. 2, p. 2062. D. Van Nostrand Co., Inc., New York, 1944.
5. Rees, O. W.—"Occurrence of Silicates in Natural Waters," Ind. and Eng. Chem. Anal. Ed., Vol. 1, pp. 200-201, 1929.
6. "Standard Methods for the Examination of Water and Sewage," 9th Ed. American Public Health Association and American Water Works Association, New York, 1946.
7. Stabler, Herman—"The Mineral Analysis of Water for Industrial Purposes and Its Interpretation by the Engineer." Eng. News, Vol. 60, p. 356, 1908.

"Some Stream Waters of the Western United States." U. S. Geol. Survey Water Supply Paper, 274, 188 pp., 1911.

8. Palmer, Chase—"The Geochemical Interpretation of Water Analyses." U. S. G. S. Bull. 479, 31 pp., 1911.

Pure's Fluid Cat Cracker

(Continued from page 82)

requiring about 3,000 to 4,000 additional pounds hourly for normal operation. The major fraction of the steam load is consumed by a 1,112-b.hp. condensing turbine which drives the blower furnishing air for catalyst regeneration. The blower is rated for an intake capacity of 10,600 cu. ft. per minute, discharging at 21 psi.

The plot plan of the new unit takes full advantage of adequate acreage available at the refinery. Its orderly layout provides easy access to all sections for inspection and maintenance. The plant comprises three parallel rows of installations. The preheater furnace, reactor, regenerator, precipitator, and catalyst-storage drums form one line, adjoining the fractionation section of the unit, including the main fractionator, stabilizer, absorber, and heat exchangers. A third row comprises pump houses, compressor, and air blower.

Addition of this first fluid catalytic cracking unit at Heath provides the company with an improved product balance for the important consumption area surrounding Central Ohio. The flexibility of both the new cracking unit and the refinery as a whole assures conformance to a wide range of future demand which may vary the economic optimum of current operations.

BOOKS

ANTITRUST LAWS ET AL V. UNIT OPERATION OF OIL OR GAS POOLS. By Robert E. Hardwicke. Published by American Institute of Mining and Metallurgy, 29 West 39th Street, New York, with the cooperation of Cities Service Co. 300 pp. $1.50.

Under the sponsorship of the Henry L. Doheny Memorial Fund, the A.I.M.E. will soon publish a comprehensive special volume on petroleum conservation. Hardwicke agreed to write for that volume a chapter dealing with legal problems, but so much material was available that the manuscript grew larger and larger, so that it eventually emerged in the present volume. In it the author presents a scholarly and comprehensive outline of the problems associated with conservation, a history of the efforts to solve the problems, and how the state and federal governments have attempted to aid. The study deserves wide reading.

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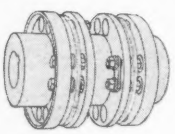

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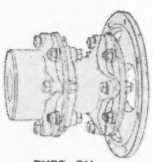

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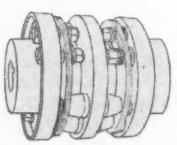
Drilling Engineers get the most out of their equipment with Thomas "Flexible" Couplings on Engine, Gear and Mud Pump Drives.



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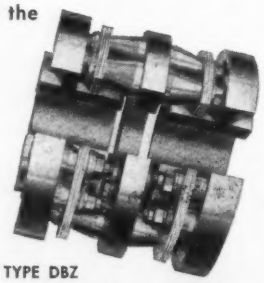

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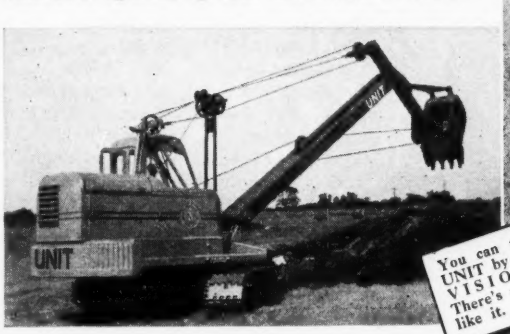

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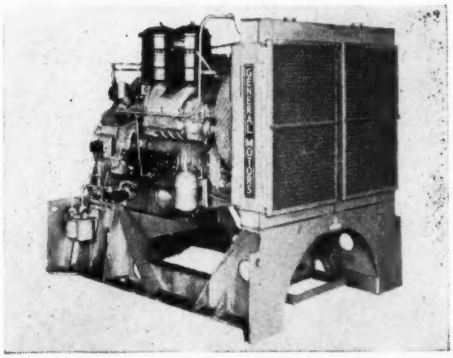

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Synthetic Alcohol

Can you direct us to a list of the production of alcohol from ethylene during the years?—F. R. P.

No single source or reference giving such information is known to this department, particularly for the late years of 1946, 1947, and now. Accordingly, this information has been accumulated and is presented on this page as Table 1. Basically, most of the data come from the yearly publication "Synthetic Organic Chemicals" of the U. S. Tariff Commission, but it is always slow in appearing.

TABLE 1—SYNTHETIC ALCOHOL PRODUCTION

Year	Total 10^6 gal.	Per cent synthetic	Synthetic 10^6 gal.
1929	[1] [2]106	....	....
1930	[1] [2]101	small	([2])
1931	[1] [2]87	[4]7.8	[4]6.77
1932	[1] [2]76	[3]9.8	[3]7.45
1932	[3]59	[3]9.9	[3]5.84
1934	[1] [5]85	[3]7.5	[3]6.37
1935	[1] [5]93	[3]10.0	[3]9.30
1936	[1] [5]101	[3]16.4	[3]16.5
1937	[1] [5]115	[3]15.5	[3]17.8
1938	[1] [5]104	[3]18.0	[3]18.7
1939	[1] [5]104	[3]24.4	[3]25.4
1940	[1] [6]126	[3]25.6	[3]32.2
1941	[1] [6]156	[3]23.6	[3]36.8
1942	[1] [6]223	[3]25.0	[3]55.7
1943	[6]236	25.9	[7]58.7
1944	[6]335	19.1	[7]64.0
1945	[6]359	18.1	[7] [8]65.0
1946	[6]173	37.8	[7] [9]65.5
1947	[6] [9] [10]157	[9]44.6	[9] [10]70.0
1948	....	[10]66.7	[10]100.0

1. Aries, R. S., Chem. & Eng. News, June 23, 1947, p. 1792.
2. Nash and Howes, Proof gallons—Princ. of Motor Fuel Preparation and Application, John Wiley & Sons, 2nd Ed., 1938.
3. Aries Footnote 1 states, "not available."
4. Aries estimate.
5. Smith and Holliman of Bartlesville Bur. of Mines, Pet. Refiner, Apr. 1947, p. 75.
6. Anon., Alcohol and Solvents, Chem. Eng., Feb. 1948, p. 120—Proof gallons.
7. Beamer, C. M., Chem. Eng. Progress, Vol. 43, 92 (1947) Mar.—approx. because measured by dividers from a small figure.
8. Egloff, G., States 111 Million Gallons as if it Were Pure Alcohol, The Oil and Gas Journal, Aug. 30, 1947, p. 88.
9. Alcohol Tax Unit of U. S. Treasury—Statistics on Alcohol for Year June 30, 1946-1947, Shows 68 Million Gallons.
10. Five-Author Symposium—The Future of Alcohol, Chem. Eng. Progress, 44, 13 (1948) Jan. The data of Burger are 160 million and 70 million gallons, and he estimates 100 million gallons synthetic in 1948 composing two-thirds.

Testing Stripped Absorption Oil

I should like to know the latest and best method for finding the per cent of light ends in lean absorption oil. I have a lot of trouble with regular Engler distillation.—W. B. H.

Although distillation tests on a large (2,000-cc.) sample using an iced condenser are widely used, probably the nearest to a standard test is the vapor-pressure test of the California Natural Gasoline Association found in "Standard Procedures for Testing Lean Absorption Oil," Bull. S-343, test No. 5 (1934). This test procedure may be obtained from the association at 510 West Sixth Street, Los Angeles. It involves the use of a special equipment which minimizes the change in composition that occurs when a gas-charged liquid is being tested.

Test No. 4, "Distillation of Absorption Oil, Hempel Method," also described in Bull. S-343 (1934), involves the distillation of 4,000 ml. of lean oil in a sheet-iron flask 8 in. in diameter and having a straight wall height of 7 in. The flask has a brass Hempel column 11 in. long and packed for a length of about 7 in. with single jack chain. The rate of distillation is 5 ml. per minute and the condenser (regular A.S.T.M. distillation condenser) and receiving cylinder are held at 32°-40° F. with cracked ice. Twenty milliliter fractions are collected in separate 25-ml. cylinders until a vapor temperature of 350° F. is attained.

Note that vapor pressure is the real test for the absorptive capacity of the lean oil, that the light hydrocarbons that affect the efficiency of the absorption oil are lost during most distillations. Discussions of the general situation are:

1. Crippen & Laird, Vapor Pressure of Lean Absorption Oil, Ref. Nat. Gaso. Mfr., March 1931, p. 106.
2. Boyd & Jones, Recently Developed Vapor Tension Method for Testing Absorption Oil, Pet. Engineer, September 1930, p. 40.
3. Liljenstein, G. M., Simplified Absorption Control Cuts Natural Gasoline Loss, The Oil and Gas Journal, January 27, 1938, p. 180.

Aviation Gasolines

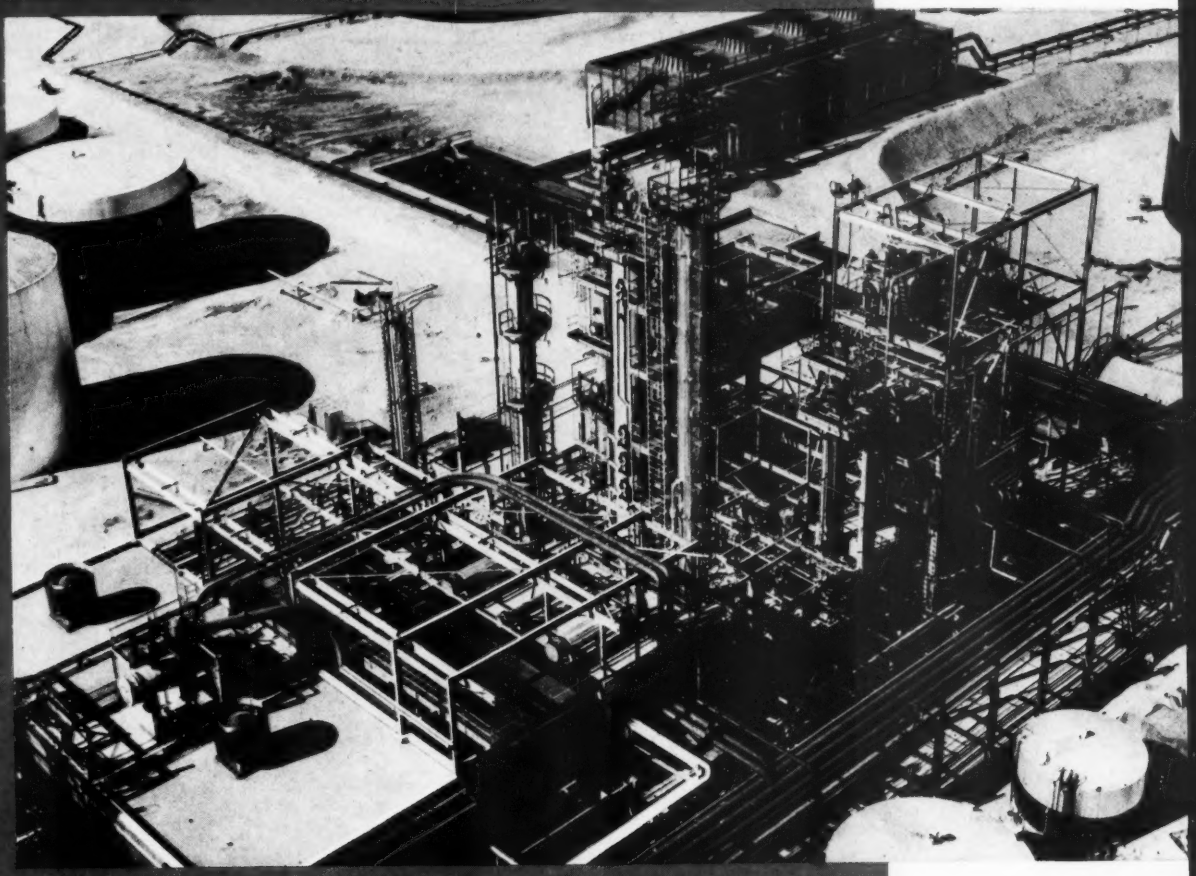
What are the specifications of commercial aviation gasolines now being marketed? Are there surveys available?—M. I. T.

Perhaps the most authoritative specifications are those recently adopted by the A.S.T.M. (D910-48T) by Committee D-2 and published in Petroleum Products and Lubricants. Undoubtedly, most of the gasoline that will be marketed in the immediate future will meet these specifications. In addition, Holliman et al, in their Survey of Commercial Aviation-Gasoline Characteristics, U. S. Bureau of Mines, Reports of Investigations RI 4273, May 1948, show the properties of aviation gasolines marketed in 1940 and 1947. The properties are shown here in an abbreviated form in Table 1.

TABLE 1—APPROXIMATE CHARACTERISTICS OF AVIATION GASOLINES

Name or grade—	Distillation range, °F: 10%	50%	90%	E.P.	Potential gum	Vapor pressure	Octane No.: Lean mixture	Rich mixture	Cu. cm. TEL per gal.	Sulfur, per cent
1. A.S.T.M. Grade 91-98	‖158	‖221	‖257	‖338	‖6	‖7	*91	†98	‖2	‖0.05
2. A.S.T.M. Grade 100-130	‖158	‖221	‖257	‖338	‖6	‖7	*100	‡100	‖3	‖0.05
3. A.S.T.M. Grade 115-145	‖158	‖221	‖257	‖338	‖6	‖7	¶100	§100	‖4.6	‖0.05
4. 1940, 91-98 grade	150	201	236	....	....	6.6	....	....	....	....
5. 1940, 100-130 grade	152	205	243	....	....	6.1	....	....	....	....
6. March 1947, 80 octane	150	197	242	314	....	6.4	80.4	....	None	0.015
7. March 1947, 91-98 octane	148	198	241	306	....	6.5	93.3	98.6	2.8	0.018
8. March 1947, 100-130 octane	152	207	246	322	....	6.3	105.9	130.9	3.36	0.016

*A.S.T.M. lean rating method, D614-48. †A.S.T.M. rich rating method, D909-48. ‡Isooctane plus 1.28 ml. TEL per gal. ¶Isooctane plus 0.47 ml. TEL per gal. §Isooctane plus 2.8 ml. TEL per gal. ‖Maximum.



crude thruput doubled . . gasoline octane level raised

CONTINENTAL
OIL COMPANY'S
DENVER
REFINERY

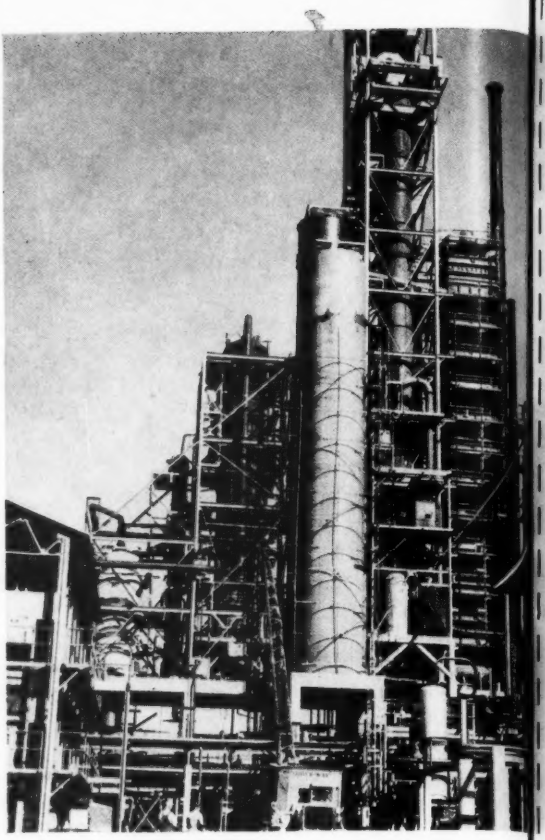
An interesting example of integrated expansion

The new Lummus-built catalytic cracking unit at Continental's Denver Refinery was recently completed. Despite unfavorable weather conditions it went on stream about the middle of November, and within two days it was operating at design capacity.

The catalytic cracking unit was part of an integrated expansion program that included the design and construction by Lummus of three other new units—gas recovery, catalytic polymerization, liquid propane gas fractionation—and the modernization by Lummus of a thermal cracking unit.

Continental's Denver Program is an interesting example of refinery expansion accomplished by integrating new units with modernized existing facilities. This program practically doubles the crude thruput at Denver and raises the octane level of the finished gasoline.

Lummus engineers are available for a thorough study of individual problems involving the modernization or expansion of existing facilities and the projection of new programs.



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NATIONAL ASSOCIATION OF CONSTRUCTORS OIL STEEL CHEMICAL

Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Estimate of a Fractionator

TENTATIVE SCHEDULE OF TOPICS

No. 7—Dec. 2, 1948—Lumber
No. 8—Dec. 9, 1948—Summary Sheet
No. 9—Dec. 16, 1948—Vessels
No. 10—Dec. 23, 1948—Special and Alloy Vessels
No. 11—Dec. 30, 1948—Fractionating Towers
No. 12—Jan. 6, 1949—Estimate of a Fractionator
No. 13—Jan. 13, 1949—Tower Insulation
No. 14—Jan. 20, 1949—Simplified Cost Estimates
No. 15—Jan. 27, 1949—Pipe Insulation
No. 16—Feb. 3, 1949—Insulation for Cold—I

Information was published in Cost-imating Notebooks Nos. 9, 10, and 11 by which the cost of a fractionating tower may be estimated.

Example—A 6-ft. diameter fractionating tower has a total length, including the skirt, of 50 ft. The shell is ⅝ in. thick and the heads are ¾ in. thick. The tower contains 18 steel bubble trays, each with an 18-in. manhole, and there is a manhole at the bottom. It also has numerous connections which are listed in Table 1.

The cost of $18,055 of Table 1 does not include insulation, ladders, platforms, X-ray inspection, or stress-relieving. The 1948 price would be up by a factor of about 1.51 or about $27,200.

TABLE 1—ESTIMATE OF A FRACTIONATOR (SEE EXAMPLE)

		1946 costs M & L	See Cost-imating
1—Shell, weight, 50 by 481	24,050 lb.		9
1—Heads, weight	2,360 lb.		9
	26,410 lb. at 12c/lb.	$3,170	9
19—Manholes, 18 in., at $335		6,365	9
1—Vapor line, nozzle, 10 in., at $115		115	9
3—Nozzles, 4 in., at $41		123	9
6—Nozzles, 2 in., at $24		144	9
6—Couplings, 1 in., at $2.70		16	9
7—Insulation rings, 7 by 46	322 lb.		10
1 lot—Steel at base	315 lb.		10
	637 lb. at 30c/lb.	191	10
18—Steel bubble trays, complete at $340		6,120	10
Total shop cost		$16,244	
1—Erection at 10 per cent (no field assembly) (job)		1,624	10
1—Freight 300 miles on 25 tons at 2.5c/ton mi. (job)		187	9
Total erected		$18,055	

Special plates should be estimated by a consideration of the items that compose them. Thus, for the $340 plates of Table 1 (see Cost-imating No. 11):

Plate	615 lb.
Downspout	178 lb.
793 lb. at 30 ct.	= $238
99 caps, 4 in. at 82 ct.	= 82
	$320

In preparing Table 2, the 1946 costs of Cost-imating Nos. 9, 10, 11, and 13 (next week) were used. Fittings for the ½ and ¾-in. thickness towers are standard 300-lb. fittings but for the ¼-in. thickness towers only 150-lb. fittings were employed. The heads on all towers are ⅛ in. thicker than the straight shells. An 18-in. manhole is supplied for each tray (and one extra), customary vapor and liquid lines and openings are provided, liquid holdup space and a support skirt totaling 12-16 ft. of shell is provided, the tower is equipped with a ladder with guards and a platform at the top, structural steel as needed is provided at the base and top, the towers are insulated with a 2½-in. layer of magnesia lagging, the foundation is adequate for an 80-m.p.h. wind, and the towers are considered to be stress-relieved, examined by X-ray, and set on the foundation.

TABLE 2—QUICK ESTIMATE OF TOWER COSTS, 1946*

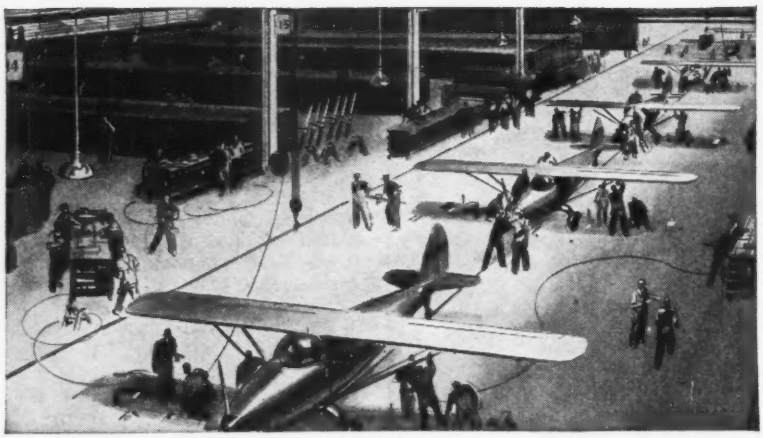
(Dollar per tray for complete towers including insulation, freight, foundation, ladder, one platform, connection, stress-relieving, X-ray inspection, and erection)

Diameter (ft.)	Thickness, ¼ in. 8 plates	Thickness, ¼ in. 30 plates	Thickness, ½ in. 8 plates	Thickness, ½ in. 30 plates	Thickness, ¾ in. 8 plates	Thickness, ¾ in. 30 plates
3	550	720	670	890	750	990
4	680	886	820	1,080	885	1,170
5	828	1,080	975	1,290	1,040	1,380
6	982	1,280	1,140	1,510	1,210	1,600
7	1,185	1,545	1,340	1,775	1,410	1,865
8	1,395	1,820	1,555	2,060	1,650	2,180
9	1,625	2,120	1,800	2,380	1,910	2,520
10	1,885	2,460	2,085	2,760	2,210	2,920
11	2,160	2,820	2,400	3,180	2,540	3,360
12	2,500	3,260	2,735	3,620	2,890	3,820
13	....	....	3,070	4,060	3,230	4,280
14	....	....	3,440	4,550	3,620	4,790

*The "per tray" cost of 60-plate towers is about 93 per cent of the cost of 30-plate towers.

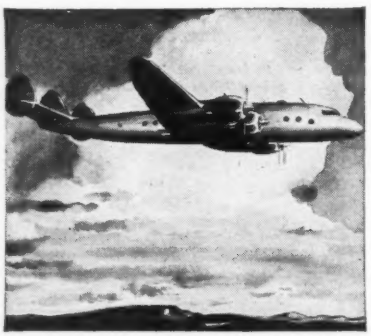
No. 12 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

Seven new planes completed ...at a cost of $4.30!



New planes can't fly without control cable, and this manufacturer needed some —fast. He got it the same way he regularly gets many supplies and parts—by Air Express. Ordered in A.M., delivered to plant same day. 500 miles, 28 lbs., Air Express charge only $4.30. So production continued without a break.

$4.30 included pick-up and delivery at no extra charge—and receipt for shipment. All this, plus the *world's fastest shipping service.* That's Air Express—used with profit by every business.



Shipments go on all flights of Scheduled Airlines. Speeds up to 5 miles a minute—no waiting around. Direct service to over 1,000 airport cities, air-rail for 22,000 off-airline offices.

Facts on low Air Express rates:

22 lbs. of new fashions goes 700 miles for $4.73.
6-lb. carton of new jewelry line goes 1,000 miles for $2.24.
Same day delivery in both cases if you *ship early.*

Only Air Express gives you all these advantages: Special pick-up and delivery *at no extra cost. You get a receipt for every shipment* and delivery is proved by signature of consignee. One-carrier responsibility. Assured protection, too—valuation coverage up to $50 without extra charge. Practically no limitation on size or weight. For fast shipping action, phone Air Express Division, Railway Express Agency. And specify "Air Express delivery" on orders.

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AIR EXPRESS GETS THERE FIRST

Rates include special pick-up and delivery door to door in principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE
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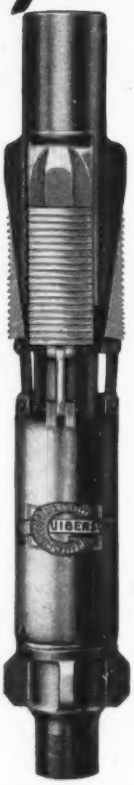
Safeguard TUBING with Guiberson TUBING CATCHER



Stops the parted tubing before it falls 3 inches, without damage to casing walls. Releases easily and quickly and has large fluid and gas bypass area. Hangs free until tubing drops. Large area slips grip the casing wall firmly without distorting casing.

Reg. U. S. Pat. Off.

Type "E" Tubing Catcher

Type "B" Tubing Catcher

Three types with or without anchors for all sizes and weights of casing: Made in Type "E" with 3 slips for wells to 11,000 feet, Type "B" with 3 slips for wells to 7,200 feet, and Type "F" with 6 slips for extremely deep wells.

For complete data see the Composite Catalog, page 1528-32 or write to

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ENGINEERING fundamentals

Total Gas Volumes for Gas Drive

FORMER discussions in this series have dealt with the use of k_g/k_o ratio as a basis for correlating engineering quantities in gas drive and as a basis for predicting gas-drive behavior. The theory indicates definite correlations between rate of oil production, gas-oil ratios, and cumulative production under conditions of simplification such as constant-pressure operations, negligible amounts of gas in solution, and constant gas-injection rates. The analysis can be extended to include a variation between the total gas volumes required and the cumulative oil production or reservoir-oil saturation.[1,2]

The total gas produced during the time interval from 0 to t is written as:

$$V = \int_0^t Q_g dt \qquad (1)$$

The rate of gas production (assumed to be equal to the rate of gas injection) can be written from the gas-oil-ratio equation, as follows:

$$Q_g = Q_o \left(\frac{k_g}{k_o}\frac{\mu_o}{\mu_g}\frac{\beta}{v} + r\right) \qquad (2)$$

However, from the above simplifying assumptions, r is neglected and $\frac{\mu_o}{\mu_g}\frac{\beta}{v}$ is a constant quantity. Therefore, substituting (2) and (1) gives:

$$V = \frac{\mu_o}{\mu_g}\frac{\beta}{v}\int_0^t Q_o \frac{k_g}{k_o} dt \qquad (3)$$

The relation between k_g/k_o and oil saturation is:

$$k_g/k_o = ae^{-bS_o} \qquad (4)$$

Therefore:

$$V = \frac{\mu_o}{\mu_g}\frac{\beta}{v} a\int_0^t Q_o e^{-bS_o} dt \qquad (5)$$

By definition the oil rate, Q_o, is:

$$Q_o = -\frac{d(S_o/\beta)}{dt} \qquad (6)$$

Substituting this equation in (5) gives:

$$V = -\frac{\mu_o}{\mu_g}\frac{a}{v}\int_0^t e^{-bS_o} dS_o \qquad (7)$$

which when integrated gives:

$$V = \frac{\mu_o}{\mu_g}\frac{a}{vb}[(e^{-bS_o})_t - (e^{-bS_o})_o] \qquad (8)$$

Equation 8 can be rearranged and the logarithm of both sides taken to yield the following equation:

$$\log\left[V + \frac{\mu_o}{\mu_g}\frac{a}{vb}(e^{-bS_o})_o\right] = \log\frac{\mu_o}{\mu_g}\frac{a}{vb} - bS_o \qquad (9)$$

which indicates a linear relationship between log V and reservoir oil saturation after shifting log V by the amount indicated within the brackets. Day and Yuster[1,2] show empirically a straight line without shifting. Equation 9 reduces to this provided the additive term is zero, a condition met by $k_g/k_o = 0$ at $t = 0$, which is a special case.

The reservoir-oil saturation can be replaced by cumulative oil according to:

$$C = \frac{1}{\beta}[(S_o)_o - (S_o)_t] \qquad (10)$$

The resulting relationship is of the same form as Equation 9 but with a different slope and intercept.

Equation 9 is supported by field data. Fig. 1 is a plot of data taken from "Secondary Recovery of Oil in the United States," (page 227), and converted to cumulative gas and cumulative oil. A shift of the V axis definitely produces linearity. It is evident that the amount of shift could be used to estimate $(k_g/k_o)_o$ or $(S_o)_o$. It is to be remembered that in these equations V as well as C are quantities per unit of pore volume.

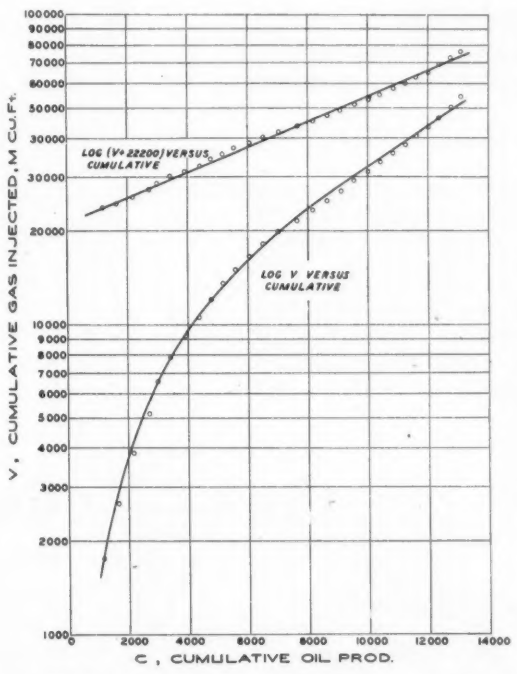

Fig. 1—Gas-drive data fitted to Equation 9. ("Secondary Recovery of Oil in the United States," p. 227)

Nomenclature: See Engineering Fundamentals No. 356.

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1. Predictions of Behavior in Air Gas Drive, Day and Yuster, Bulletin No. 41, The Pennsylvania State College Mineral Industries Experiment Station.

2. Gas Requirements in Gas Drive Recovery, Yuster and Day, The Producer's Monthly, Oct. 1946, Vol. 10, No. 12.

3. A Note on Repressuring, M. Muskat, Producer's Monthly, Feb. 1946, Vol. 10, No. 4.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

with pleasure

THE GEOTECHNICAL CORPORATION ANNOUNCES THE ADDITION OF . . .

In acquiring control of Garrett Exploration Company and affiliated interests effective November 1, 1948, The Geotechnical Corporation has entrusted the seismic surveys and geophysical operations of that company to a successor corporation, GEOTECHNICAL EXPLORATION CORPORATION.

GEOTECHNICAL EXPLORATION CORPORATION

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W. W. Newton, *Vice President* — **C. G. Walters**, *Treasurer*

AND . . .

Effective October 1, 1948, The Geotechnical Corporation acquired control of Walters Drilling Company of Dallas, Texas. The field operations and drilling undertakings of that company have been assumed by a successor corporation, GEOTECHNICAL DRILLING COMPANY

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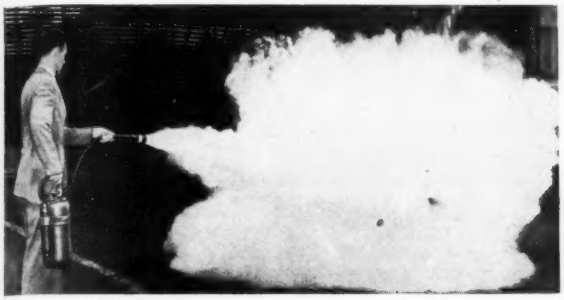
OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

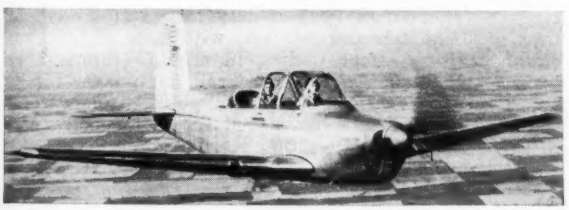
by Craig Espy



(1) POWDER EXTINGUISHER. Designed for use against flammable liquid and electrical fires in oil refineries, pipe lines, and industrial plants. Made in 20 and 30-lb. capacities, the new extinguisher contains a special dry powder mixture that will not pack or obstruct discharge. It affords convenient, one-hand operation with trigger-finger control. Light-weight construction makes for speed and effectiveness in combating fires. *Walter Kidde & Co.*

IT'S NEW ✓ CHECK IT

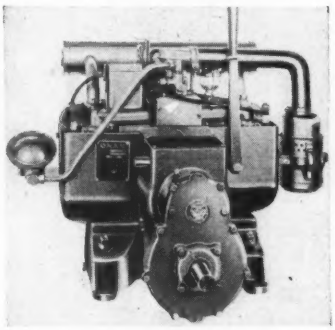
(2) BEECHCRAFT MODEL 45 "MENTOR." New especially designed, privately financed military craft is a single-engine, all-metal, two-place plane. Developed inexpensively by using the Beechcraft Bonanza as a basis,



it meets all the latest Air Force specifications. Powered with a Continental E-185 engine, first official engineering estimates indicate that it will have a cruising speed of 160 m.p.h. at 10,000 ft., a true air high speed of 176 m.p.h. at sea level, and a permissible indicated maximum dive speed of 280 m.p.h. It has extremely high performance combined with low fuel consumption. *Beech Aircraft Corp.*

IT'S NEW ✓ CHECK IT

(3) OIL-FIELD ENGINE. Built for continuous heavy-duty service on tough oil-field pumping jobs, new two-cylinder air-cooled pumping engine develops 1,000 in.-lb. torque with 960-ft. piston speed. Engine is rated at 5½ hp. continuous duty. Speed is reduced to 525 r.p.m. at P.T.O. by a 4-to-1 reduction gear. Standard equipment includes stellite exhaust valves and seats, extra-large oil-bath air cleaner, variable-speed governor control and over-center dry disk clutch. Gas-gasoline carburetion with secondary regulator permits operation on both gasoline or natural gas. Length (including shaft) is 24½ in., width 28½ in., height 23⅜ in. Net weight: 160 lb. *D. W. Onan & Sons, Inc.*



IT'S NEW ✓ CHECK IT

(4) MULTIPLE REFILL-TYPE OIL PURIFIER employs seven filtering units. Maximum capacity exceeds 2,100 gal. per hour of 50 seconds viscosity. Inside the steel shell, seven individual units are mounted on center tubes. Each unit consists of a perforated steel basket containing a cloth bag with a capacity of 104 lb. of Cranite (specially processed fullers earth). Purifier has greater purification capacity than seven smaller purifiers. It is much more compact, being 4 ft. in diameter and 6 ft. high. Entirely automatic in operation, it has no moving parts. Contaminated oil enters the inlet pipe, penetrates the cloth bag of the filter unit, and passes through the Cranite, the felt cover of the

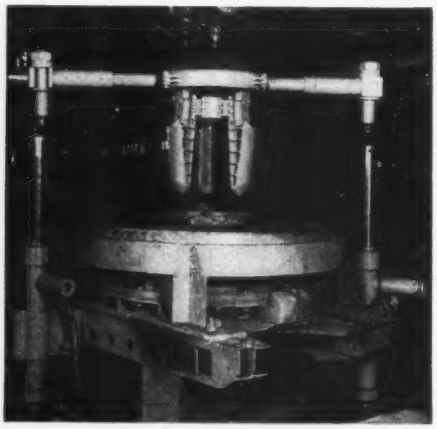
The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

center tube, and a metal-cloth screen. Oil then rises to the top of the center tube and down the stand pipe to the clean-oil outlet. *Honan-Crane Corp.*

IT'S NEW CHECK IT

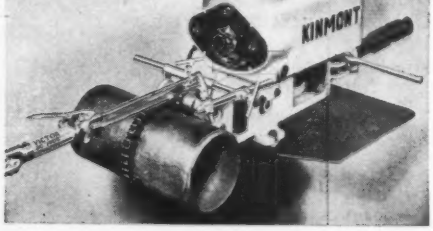
(5) "BALANCED" POWER SLIPS. To insure greater personnel and equipment safety in drilling operation, manufacturer has added two new features to line of



power slips. Since a clear floor is very important, operating cylinders have been lowered so that the stuffing box is below floor level. By means of toggle pins the operating piston rods are segregated so that the slip assembly may be taken off the rig floor and the pistons let down below floor level. Floor plates to cover piston openings are now provided. "Leveling links" have also been developed which provide a connection between each of the three slip segments. These assure an even, noncrushing grip and perfectly coordinated and synchronizes operation. Power slips can be installed on "jackknife" rigs in the same manner as on "deep hole" power and steam rigs. *The DeLaney Co.*

IT'S NEW CHECK IT

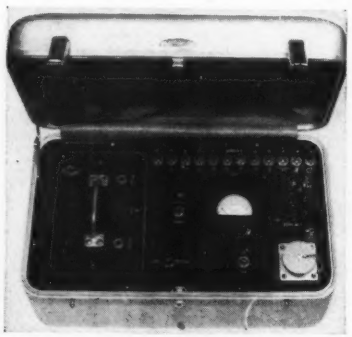
(6) NEW CUTTING-TORCH ATTACHMENT is available for use with manufacturers' power unit. Attachment permits easy and fast adjustment of the cutting torch in handling a wide range of pipe sizes. It maintains a smooth



bevel and a square cutoff across the end of the pipe. Wide adjustment range permits its use on any pipe size from 3 up to 36 in. in diameter, and on tanks up to 10 ft. in diameter when turned on a roller rack. The turning speed of the power unit is controllable while cutting operation is in progress, thus assuring a smoothly finished cut. A foot switch controlling the turning operation leaves the operator's hands free to control the torch and speed adjustments. *Kinmont Manufacturing Co., Inc.*

IT'S NEW CHECK IT

(7) CABLE FAULT FINDER is designed for fault detection in multiple-conductor geophysical cable regardless of number of conductors. It is capable of pin-point location of open circuits. Equipped with adapter for locating short circuits. It is also applicable to fault detection in all types of unshielded cable. Unit is completely self-contained. Includes battery in all-aluminum case. Approximate dimensions 8 by 9 by 16 in.; approximate weight 19 lb. *Century Geophysical Corp.*



IT'S NEW CHECK IT

(8) COMBINATION OIL-FIELD TRUCK BODY. A new body solves common problems of fifth-wheel, gin pole, tool box, etc. Fifth wheel releases by cable control. Hand-

ring at left front of body is easy to get at. Body may thus be completely decked over, with none of the usual cutouts through floor plating in attempt to make release lever accessible. New side rail has pocket for gin poles, thus preventing loss of gin poles through rough country or when booming a load across the body. New tool box has improved weather-resistance features. *Hobbs Manufacturing Co.*

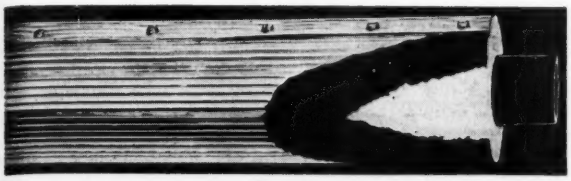
IT'S NEW CHECK IT

(9) NEW MODEL HYDROCRANE. Three-ton capacity Hydrocrane, big brother to this firm's 2-ton model, is designed to handle small jobs economically. Unit is powered by truck engine, governor-controlled to run at the middle of its normal speed range. Full hydraulic operation eliminates shafts, drums, gears, clutches, brakes, chains, and sprockets. Operation is easy, because there

is no need to synchronize hand and foot motions. There are no clutches or brakes to slip. Hydraulic control is positive and precise. Supplied as a complete package mounted on a new motor truck, it travels at highway speeds. *Bucyrus-Erie Co.*

IT'S NEW CHECK IT

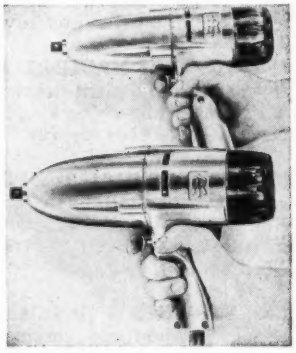
(10) ALUMINUM JACKETING. Scientifically designed metal jacketing for the protection of industrial insulated



lines. It is made from a light-weight aluminum sheet, corrugated for extra strength and easy application. Comes complete with moisture barrier attached. This gives both outside protection and inside protection. Goes on fast because it is light. Is easy to handle and can be fastened at the joints by screws. Jacketing needs no painting, no maintenance. It can be reused when lines are moved. It is manufactured from 0.0055-in. thick aluminum with 3/16-in. corrugations for strength and is 2 S, full-hard aluminum. Moisture barrier has a base of 70-lb. kraft paper, fully impregnated with special asphaltic compounds. *Childers Manufacturing Co.*

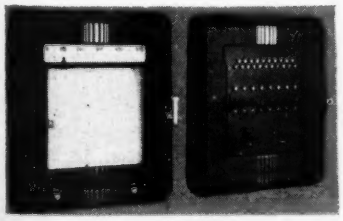
IT'S NEW CHECK IT

(11) HEAVIER IMPACT TOOL. All-purpose electric tool, with standard accessories, will run and remove nuts up to ⅝-in. thread size; drive and remove studs; extract broken cap screws and studs; apply and remove machine screws of all kinds; run wire brushes; drill brick, metal, and masonry; tap; and ream. Impact principle operates whenever resistance is met and provides extra power to push through the job. Virtually no torque reaction is transmitted to the operator under any condition. The new tool is 12⅛ in. in length and weighs 9 lb., 13 oz. It is available for either 110 or 220-volt current and operates on a.c. or d.c. *Ingersoll-Rand Co.*



IT'S NEW CHECK IT

(12) SPEEDOMAX INSTRUMENT. Automatically logs as many as 160 separate thermocouple temperatures in succession at a rate of 4 seconds per point. Because each point is checked at such frequent intervals, high or low temperatures can be spotted readily before serious trouble results. In case of trouble, the operator can cut thermocouples out of the measuring sequence in banks of 20 at a time. Or, he can set the instrument to record any single thermocouple, or to record all points continuously. The equipment consists of two parts, a recorder and a switch assembly, both housed in separate cases. *Leeds & Northrup Co.*



IT'S NEW CHECK IT

(13) HEAVY-DUTY SAFETY GLOVE is ideal for handling castings, rough stock, grinding, and similar work. Made of specially treated chrome-tanned cowhide for long wear, the glove features a canvas back with elastic strap to overcome hand fatigue while providing a cooler feeling and snug fit. All necessary seams are steel sewed. Wearing surface of the palm has been increased by extending the palm. There is no bib patch, another comfort feature. Steel stapled strap at the thumb crotch fortifies this part of the glove. A steel-stapled patch is on the face of the thumb. Glove also has a short cuff with tape binding. *American Optical Co.*

IT'S NEW CHECK IT

(14) SAFETY LOAD BINDER has safety factor well beyond permissible load on chains. Built for oil-field service it is also used by private truck operators. Its use eliminates "cheaters." It can be tightened at any interval of transportation without disengaging hooks. Small ratchet handle tightens chains to any desired tension. Simple in construction, unit is filled with lubricant and is dust and grease sealed. It has hardened-steel working parts and antifriction bearings. *Frank Mathey Machine Works, Inc.*

IT'S NEW CHECK IT

(15) IMPROVED SHALE SHAKER. New model of 4½ by 5 ft. and 3 by 4 ft. shakers is equipped with aluminum side guard bars and side stretcher bars in place of wood parts formerly furnished. The use of aluminum bars makes it easier to install and stretch screen cloth as the bars are free from warpage or swelling. Also operating cost and expense for repair parts are reduced. The aluminum side guard bars and side stretcher bars will soon be available as replacement parts for wooden parts. *Overstrom & Sons.*

IT'S NEW CHECK IT

TRADE LITERATURE

(16) INDUSTRIAL ENGINES. Two bulletins on models 2269-0 and 400-0, show engines in actual use, features of construction and many distinct advantages. Condensed specifications carried on each model. Unit construction also featured. *Hall-Scott Motor Division.*

(17) STORY OF NATIONAL SUPPLY CO. The 10,000-word text is liberally illustrated with drawings and photographs. It is the story of the founding, growth, and op-

erations of a modern industrial giant; it is also the exciting and informative story of the 22-billion-dollar petroleum industry which the company serves. *The National Supply Co.*

(18) REFERENCE DATA BOOK ON FORGINGS. Forty-four-page catalog describes in detail various types and characteristics of forgings. Tables present complete information on the characteristics and applications of commercial forging metals. *Steel Improvement & Forge Co.*

(19) AUTOMATIC PRESSURE TEMPERATURE AND FLOW CONTROLS. Catalog of 56 pages illustrates complete line of automatic pressure, temperature, level, and flow controls. Contains valuable engineering data and specifications. *General Controls Co.*

(20) GUIDE TO CORRECT INSTRUMENT SELECTION gives comprehensive bird's-eye view of this firm's entire industrial instrument line. The field of application of each type of instrument is covered as well as its princible of operation and range limits. *Taylor Instrument Companies.*

(21) INSPECTION, CARE, AND USE OF CHAIN. Contents of new booklet include: check list of things to look for when inspecting chain; factors that govern proper use, a plan for assuring necessary care. *S. G. Taylor Chain Co.*

(22) pH AND CONDUCTIVITY RECORDERS AND CONTROLLERS, and their application to different processes is a feature of new 43-page catalog. Fully illustrated with photographs and schematic drawings. *The Brown Instrument Co.*

(23) CEMENTING EQUIPMENT. Bulletin covers problems of cementing; shows how cementing shoe of manufacturer performs triple service. Of special interest to those who must cement off a water zone. *Baker Oil Tools, Inc.*

(24) CORROSION-RESISTANT CONCRETE. The booklet gives late developments on corrosion-resistant concrete used in wide variety of industrial applications, including lining stacks, and oil-refinery vessels. *Universal Atlas Cement Co.*

(25) SPEEDING OIL-FIELD WORK. Two-color booklet contains eight pages of illustrations describing various jobs of leveling locations, drilling, moving equipment, digging slush pits and pumping leases as they are done by this firm's diesel engines and tractors. *Caterpillar Tractor Co.*

(26) TWECO PRODUCTS. New 12-page "Twecolog" illustrates manufacturer's complete line. Contains valuable information about the maintenance and care of electric welding cables, connections, grounds and holders. *Tweco Products Co.*

(27) ELECTRIC BATTERY CONNECTOR BULLETIN of 24 pages, in 2 colors, contains photos, application pictures, and technical data on battery connector line, used on oil-field and stationary-engine starting equipment. *Cannon Electric Development Co.*

(28) PERFORMANCE REPORT ON SHUTOFF VALVE. Strictly factual report describes development, applications, design characteristics of positive shutoff valve for highly corrosive and highly penetrating fluids. *Sellers Injector Corp.*

(29) PRESSURE-SEALED BONNET VALVES BULLETIN. Catalog section describes all types of this firm's steel valves. A new method for correlation of valve size and pressure drop is also included. *Edward Valves, Inc.*

(30) HEAT EXCHANGERS. Informative 32-page bulletin on tubular heat exchangers describes the present designs of G-R tubular heaters, coolers, condensers, and heat exchangers and their distinctive features. *Griscom-Russell Co.*

(31) CUSTOMAIRE PLANE. Four-page bulletin describes plane. Closeup pictures show cowling, mufflers, cabin, instrument panel, control pedals, and tail wheel. Construction specifications given. *Funk Aircraft Co.*

(32) MICHIGAN SHOVEL CRANE. Bulletin describes four ½-yard models, two with single engines, two with twin engines. With highway speed, four-wheel drive, changeable crane, boom hoist, and shovel attachments one machine does the work for four. *Michigan Power Shovel Co.*

(33) OIL-FIELD PUMP. With enlarged sectional drawings, unusual mailing piece describes and pictures how pump works and what it will accomplish. Gives long check list of outstanding advantages. *T & C Pump Co.*

(34) TOP-SIZE HAULING JOBS. Bulletin describes extra heavy-duty giant truck, giving basic specifications. Three-man, full-vision cab, air brakes and other features described. *Reo Motors, Inc.*

(35) CENTRIFUGAL PUMPS. Bulletin, 12 pages, gives specifications, tells how to select and install pumps. Ratings and speeds are shown by means of curves. Dimensions also given. *Worthington Pump & Machinery Corp.*

(36) WINCHES AND POLE DERRICKS. Bulletin describes oil-field winches manufactured by this firm including "Low Mount," "Utility," and "Heavy Duty." Also covers pole derrick and various truck accessories. *Gar Wood Industries, Inc.*

(37) JEWEL PIPE WELDING TOOLS. A 12-page pocket-size bulletin describes pipe clamp, tube-turn clamp, angle clamp, welding flange clamp, and pipe marker. Diagram shows layout and erection plan for rapid welding. *Jewel Manufacturing Co.*

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The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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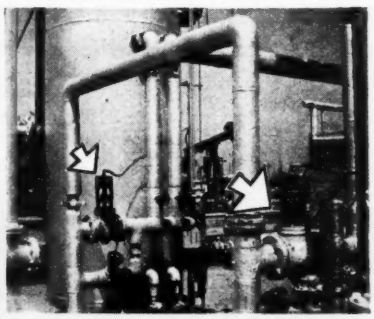

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The 28-page Oakite Petroleum Digest offers step-by-step procedures for fast cleaning of pipe lines, pumping and drilling equipment, storage tank interiors, paint-stripping of Diesel and gas engines, and other related tasks.

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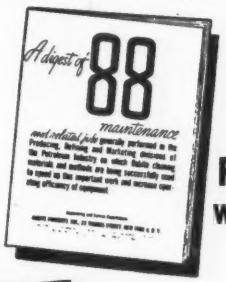

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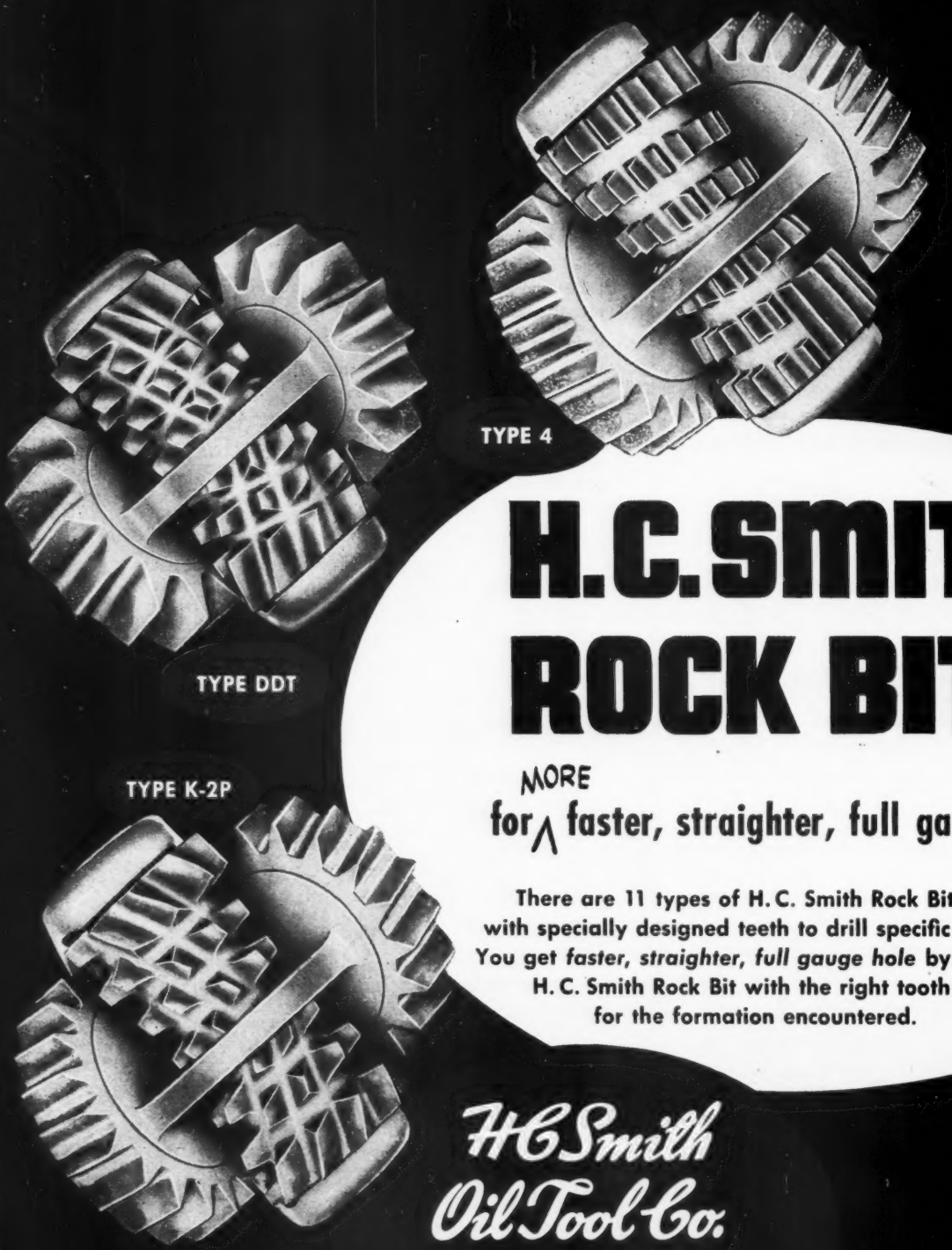

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Among the

Drilling Contractors

Kemp Drilling Co. will drill Sohio Petroleum Co. 1 Raworth, C NW SW 26-12n-10e, 4 miles south of Highland in Tensas Parish, Louisiana. This will be a 9,000-ft. or Paluxy test.

Peterson Drilling Co. will drill its 2 Dean, SW NE 16-14s-19w, 5 miles west of Buena Vista, Ouachita County, Arkansas, a test of the Nacatosh sand.

Newton Barrett Drilling-W. A. Delaney, Jr. 2 Abel-B, SW NE SW 10-9n-8e, Seminole County, Oklahoma, is moving in rotary tools.

Spartan Drilling Co. has contract for G. H. Vaughn 1 Hanson et al, NW NW 22-16s-23w, 3 miles southeast of Stamps in Lafayette County, Arkansas. Contract depth is 5,000 ft.

Woods Drilling Co. has started its 1 Radford-Shell, S. A. Barnard Preemption Survey; Abstract 1701, Block R, Section 13, W. E. Hatchett Survey, 2 miles west of Royston, Tex., in Fisher County. Scheduled depth is 6,500 ft.

Anderson-Carey Drilling Co. has set surface pipe in Derby Oil Co. et al 1 Bailey, NE SE NE 9-8n-2e, northeast of the West Burnett pool in Pottawatomie County, Oklahoma.

Arvin Drilling Co. will drill its 1 Mauck, SE NW 34-1s-11w, a wildcat in Gibson County, Indiana.

Bert Mullins has set surface pipe in Tom Ferguson 1 Clinton, NW NE SW 21-27n-15e, Nowata County, Oklahoma.

R. C. Patton will drill Deardorf Oil Corp. 1 Washbon, SW SW NE 15-32s-7w, 2 miles southwest of Harper in Harper County, Kansas.

Milton Crow, Inc., has contract for N. A. Harding and T. W. McGuire 1 Mitchell, NE SW 35-13s-23w, 3 miles west of Bodcaw townsite, Nevada County, Arkansas. Contract depth is 5,000 ft.

Jackson Drilling Co. is drilling below 2,315 ft. at Westgate-Greenland Oil Co. 1 Angel, SE SE SE 3-11s-15w, 2 miles northeast of the Fairport pool in Russel County, Kansas.

Briscoe-Clingman Drilling Co. is rigging up rotary tools at its 1 School

The Norwood Drilling Co. crew at the Cooper-Hemphill Oil Co. Nick Alley 1, 4 miles southwest of Hale Center, Hale County, Texas. Bottom row: Charles F. Hemphill, Nick Alley, and C. E. Cooper. Top: J. W. Armstrong, C. C. Jones, Ray L. Griffin (driller), Vestal Ridge, and Q. J. Clement

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WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

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Length	7' 6"	5'
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Height	3'	2' 6"
Skid Length	8'	6'
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Built of heavy gauge sheet metal . . . heavily braced at all edges and corners . . . cover fitted with piano-type hinge and steel handle with hasp for padlock . . . in open position lid held by safety catch . . . mounted on sturdy skids.

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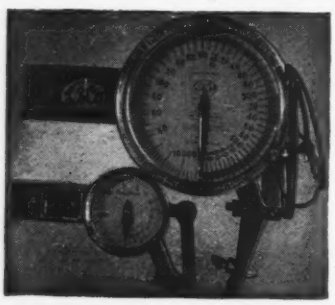

(Above) Super 500,000-lb. capacity, 14" dial. (Below) Packer Special, Capacity 40,000 lbs., 6" dial. 18 other models for every drilling, well servicing, or work-over need.

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With a LINE SCALE you know the pull on the line, and the weight on the bit in pounds. Repeated tests prove the accuracy and dependability of LINE SCALE readings under all working conditions . . . even in areas of rapid temperature changes.

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Land, NE NW NW 16-10n-5e, Pottawatomie County, Oklahoma.

B & R Drilling Co. has staked location for its 1 Kuhlman, NW SW SW 12-19s-15w, 1 mile southeast of the Merten pool in western Barton County, Kansas.

General Petroleums, Ltd., will drill Midland Petroleums No. 1, LSD 11, 23-52-27w4. The location is about 15 miles west of Edmonton, Alberta, Canada.

Woods Drilling Co. will start soon on its 1 D. E. Moore, C NE NE 12-16n-3e, a 4,200-ft. test in Lincoln County, Oklahoma.

Kemp Drilling Co. will drill Cities Service Oil Co. 2 Hazlip, 83-7n-2w, in LaGrange field of Adams County, Mississippi.

Jordan Drilling Co. has staked location for its 1 Moore, 660 ft. from north and east lines of NW¼ Section 453, Block 97, H&TC Survey, 12 miles north of Snyder in North Scurry County, Texas. Cable tools will be used.

Helmerich & Payne, Inc., will drill Sells Petroleum, Inc., 1 Johnny Williams, NW SE 4-4n-7e, 10 miles northwest of McComb in Pike County, Mississippi. This will be an 11,000-ft. test.

E. D. Smith Drilling Co. is scheduled to begin soon its 2 Ollie Beard, SE NW SE 25-7s-5e, Marshall County, Oklahoma.

Circle Drilling Co. has contract to drill Nicklos, Vincent & Welch B-4 Raymond McManus, in Richie field, Acadia Parish, Louisiana, to a depth of 3,500 ft.

Norwood Drilling Co. is drilling below surface pipe in Cooper-Hemphill Oil Co. 1 Nick Alley, NW cor. Section 10, Block A-3, EL&R Ry. Co. Survey, Hale County, Texas, 4 miles southwest of Hale Center. Contract depth is 8,000 ft.

Kingery Brothers is starting its 1 G. W. Allen, SE SE SW 32-16n-5e, in Lincoln County, Oklahoma. This will be a 3,500-ft. test.

J. C. Hawkins has contract for Magnolia Petroleum Co. H-1 Doornbos-McPherson, in Hurricane Creek, Beauregard Parish, Louisiana. Projected depth is 9,000 ft. Hawkins also has contract to drill Bates & Cornell 1 Calcasieu National Bank, in China field, Jefferson Davis Parish, Louisiana. Contract depth is 9,500 ft.

Olson Drilling Co. et al have operations under way at 1 Sterm "A," C SW NW 36-31-12, 1 mile west of the Whelan pool and 1 mile north of the town of Medicine Lodge in Barber County, Oklahoma.

"You can always Break the joint"

Prepared especially for proper lubrication and protection of Tool Joint threads, Jimmie Gray's 500 Ton Tool Joint Compound* prevents washouts and galling . . . makes breaking-out easier . . . withstands highest pressures and is unaffected by heat and moisture.

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Write for New S-48 catalog just released.

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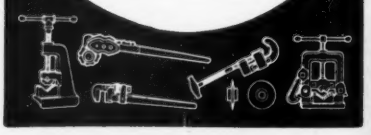

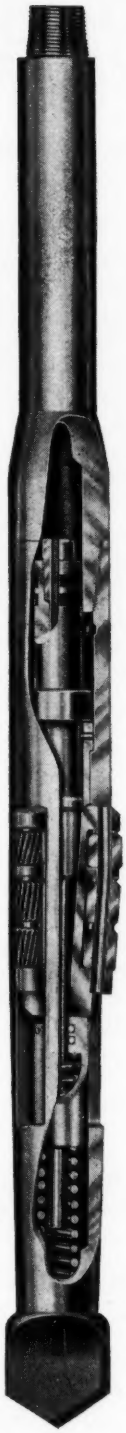

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Cutter expansion is positive. Multiple cutters insure a shearing and slicing action that cuts a smooth, full-gauge hole all the way. Simply pulling up against the shoe collapses and resets the cutters whenever desired.

The Grant Roller Cutter Underreamer is famous the world over for its trouble-free operation, efficient reaming action and rugged, safe construction under the toughest well conditions. *For all underreaming work, in any formation, you get safe, sure liner and casing landing jobs with a Grant.* Write for Bulletin 24 giving complete details, and contact the Grant representative nearest you!

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Used Where Performance Counts

Hydrostatic Bailers	Bulletin No. 11
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Bottom Hole Scrapers	Bulletin No. 21
Underreamers (Rotary)	Bulletin No. 24
Underreamers (Cable Tool)	Bulletin No. 27
Hole Enlargers	Bulletin No. 38
Reamers	Bulletin No. 43
Hydrostatic Perforation Cleaners	Bulletin No. 50
Dump Bailers	Bulletin No. 51
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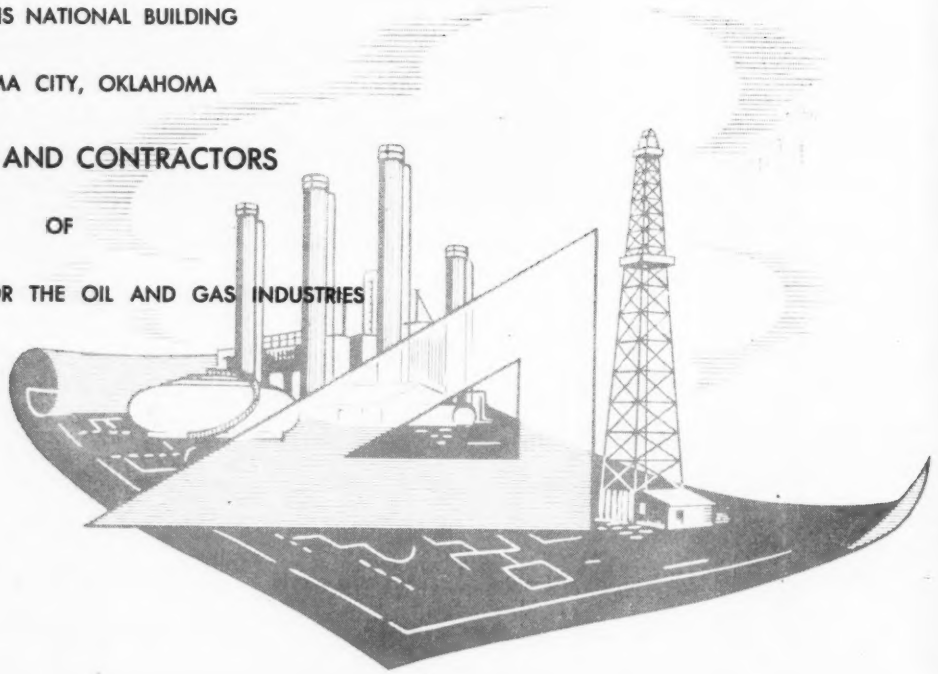

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- Compressor Stations
- Refineries
- Saltwater Disposal Plants
- Recycling Plants
- Vessel Erection
- Specialized Installations

REFINING

Asphalt Operations on West Coast Are Merged

Expanded operations, through the consolidation of the western asphalt business of Standard Oil Co. of California and its subsidiaries, effective January 1, will be carried on by Stancal Asphalt & Bitumuls Co., formerly known as California Asphalt Corp.

Merged into Stancal will be the western marketing staffs of American Bitumuls Co., another subsidiary, and Standard's own asphalt division. In addition to the California Asphalt Corp. refinery in Portland, the new company will operate the asphalt emulsion plants of American Bitumuls in Oakland and Inglewood, Calif., and Tucson, Ariz.

C. W. Stewart, head of American Bitumuls, has been named president of the Stancal organization, and H. H. Angell, formerly manager of Standard's asphalt division, has been named vice president in charge of sales. The home office will be in San Francisco, with district offices in Oakland, Inglewood, Portland, and Tucson.

Stancal will cover the territory west of the Rocky Mountains while American Bitumuls will continue to operate east of the Rockies as a subsidiary, according to T. S. Petersen, president of California Standard.

Eastern asphalt manufacture has been increased at the Perth Amboy, N. J., plant operated by a subsidiary company, California Refining Co. Total throughput capacity of the plant, formerly owned by Barber Asphalt Co., has been increased from 15,000 to 20,000 bbl. daily, and plans call for further increase to 25,000 bbl. This expansion work has resulted from modification and modernization work, rather than by addition of new units.

"Overtime" Problem to Be Discussed at W.P.R.A. Meet

Special attention will be devoted to the requirements for computing overtime payments brought about by the Supreme Court's decision in the "overtime-on-overtime" case in a discussion to be held at a 1-day regional technical-industrial relations meeting sponsored by the Western Petroleum Refiners Association at the Washington-Youree Hotel, Shreveport, La., January 28.

Earl Street, regional attorney for the wage-hour and public contracts divisions of the U. S. Department of Labor, Dallas, Tex., will speak on "Current Payroll Problems Under the Wage-Hour Law," and will lead the discussion by entertaining questions from the floor.

The technical session, scheduled for the afternoon, will be devoted entirely to a forum discussion of refinery operational problems. Question by refiners are now being received by the association. A panel of experts will be selected to discuss these questions at the meeting. No restriction has been placed on the subject matter of the questions submitted. The discussion will cover such widely diversified subjects as catalytic cracking, thermal reforming, treating, corrosion and sour-crude operations. Questions raised by those in attendance at the meeting will also be discussed by the panel.

The meeting is the first of W.P.R.A.'s 1949 series of regional technical and industrial relations meetings to be scheduled.

Longer Use of Engine Oil Is Recommended by Bureau

The Bureau of Federal Supply, the Government's central purchasing agency, has recommended that oil in the engines of government passenger cars, trucks and buses be changed only in the spring and fall, or every 4,000 miles, whichever period comes first.

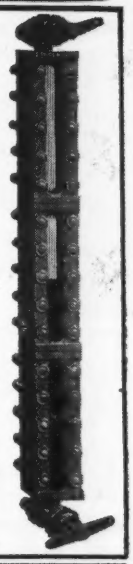
The Bureau announced that a technical committee on lubricants and liquid fuels has made studies which indicate that under normal driving conditions and controlled preventive maintenance oil changes at periods of less than 4,000 miles are unnecessary. The recommended conservation measures were estimated to save 1,500,000 gal. of lubricating oil annually or about $500,000.

Where heavy construction equipment and diesel powered machines are involved, the committee recommended adherence to manufacturer's instructions or to "a procedure that has been developed for that particular type of equipment."

Bureau of Mines Lists Shale-Oil Patents

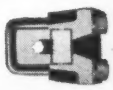
Petroleum refiners hold most of the patents as shown by the first substantially complete listing of American and foreign patents on shale-oil

PENBERTHY
"REFLEX"
DROP FORGED STEEL
LIQUID LEVEL GAGES



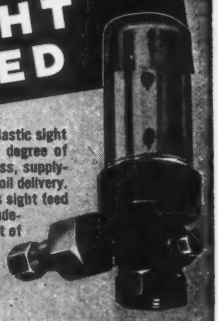
Liquid always shows black—empty space shows white. Preferred where the liquid level must be easily and positively visible, and when liquids are under high pressure or at high temperature. Made of alloy temperature resisting steel and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Reflex" is one of the complete line of Penberthy Gages that meet every liquid level gage requirement.



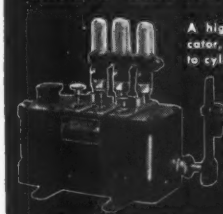
PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

McCORD
"CLEARSITE"
SIGHT
FEED



McCord "Clearsite" plastic sight feeds provide a new degree of visibility and clearness, supplying positive proof of oil delivery. Due to its design this sight feed may be used as an independent sight at point of lubrication. As an accessory it can be added to any lubrication system. Specify "Clearsite."

McCORD "SF" LIQUID SIGHT FEED LUBRICATORS



A highly developed lubricator, particularly adopted to cylinder and bearing lubrication. Features: Precision built, most flexible and positive oil delivery system known. Supplied in 1 to 24 feeds. Specify McCord "SF" Lubricator.

For Sale by National Supply Co.

McCORD CORPORATION
DETROIT 11, MICHIGAN
LUBRICATOR DIVISION

products, it was announced recently by James Boyd, director of the Bureau of Mines.

The list, "An Index of Shale-Oil Patents," includes all patents found on the records in the U. S. Patent Office up to January 1, 1945, with illustrated short descriptions of each claim. A companion volume listing patents on oil shale is expected to be available in about a year.

The index presents in compact form results of a survey begun early in 1944 after the Seventy-eighth Congress passed Public Law 290 authorizing the construction and operation of demonstration plants to produce synthetic liquid fuels. This law also authorized the Secretary of the Interior to "acquire technical data, inventions . . . and other rights and licenses under patents granted by this or any other nation."

Bulletin No. 467, "An Index of Shale-Oil Patents," compiled by Simon Klosky, Bureau of Mines research analyst, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, at a cost of 75 cents.

New German Hydrocarbon Method Explained in Report

The Department of Commerce, office of technical service, has released a report on German production of chlorinated hydrocarbons from acetylene, covering operations and equipment not covered in previous reports on the subject.

Described in detail are two of the more successful German plants now operating, Alexander Wacher A.G. at Burghausen and the I. G. Farben plant at Rheinfelden. The report deals with the following more important and better known chlorinated hydrocarbons: perchlorethylene, hexachlorethane, cis and transdichlorethylene and vinylchloride.

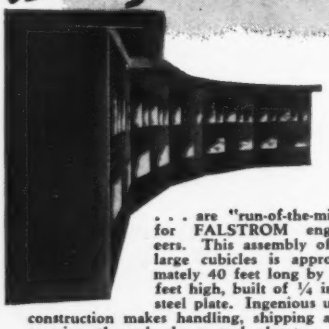
Schematic drawings, flow sheets and, in some cases, production costs for most of the chlorinated compounds are provided. In addition, processes are described giving actual quantities of materials used rather than simple summaries of operations.

The report, "Chlorinated Hydrocarbons from Acetylene," 62 pages including charts and tables, can be obtained for $2 a copy from Office of Technical Services, Department of Commerce, Washington 25, D. C.

McColl to Build Plant

McColl Frontenac Oil Co., Ltd., a subsidiary of The Texas Co., is reported planning to construct a refinery at Edmonton, Alta., presumably to process crude from Leduc field. Estimated cost of the new project was reported to be about $10,000,000. Completion of plans for the project are not verified at this time.

INSTRUMENT PANELS FOR Large Installations



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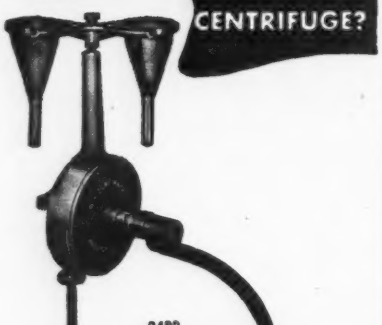

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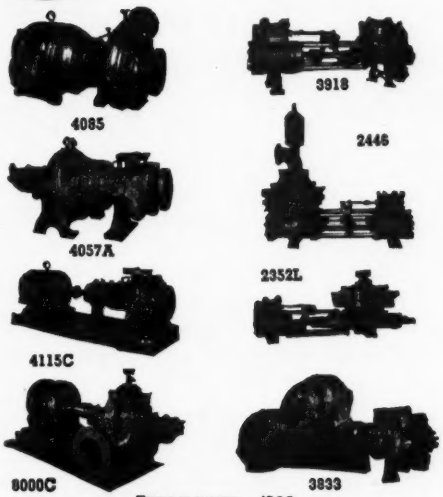

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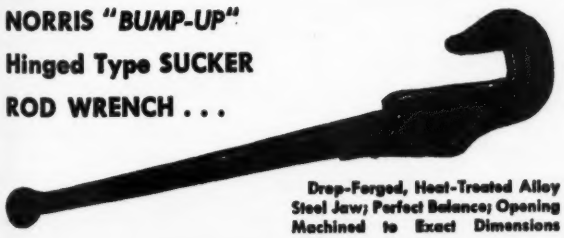

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NATURAL GAS

Extraction Facilities in Carthage Field Expanding

WHEN new construction and enlargement programs are completed in Carthage field of Panola County, East Texas, late in 1949 or early 1950, facilities for extracting the condensate from the field's gas production will be in excess of 1,000,000 M.c.f. daily. Work on new plants and expansion projects now under way will add about 520,000 M.c.f. to processing capacity, slightly more than doubling the field's current gas handling capacity. Gas reserves of the field have been estimated at from 6 to 10 trillion cubic feet so that the plants will be assured a gas supply of about 20 years.

Largest construction project under way is Carthage Corp.'s 385,000 M.c.f. (absorption capacity) plant. Practically all of the concrete foundations for vessels and other equipment are complete and most of the large vessels have been installed—particularly a low-pressure still which weighs about 100 tons. Needed tankage is about 80 per cent complete, and the loading rack and lines, and cooling tower are practically complete. The plant is expected to go in full operation within the next 3 months.

Work on expansion of United Gas Pipe Line Co.'s Cartex plant from 100,000 M.c.f. to 210,000 M.c.f. is moving slowly ahead, with completion scheduled for June 1949.

Chicago Corp. is progressing with the program of expanding its distillate plant from 100,000 M.c.f. to 200,000 M.c.f. About 75 per cent of the concrete work is completed and the plant is scheduled to be in operation by July or August 1949. Arkansas Fuel Oil Co. has virtually completed expansion of its Panola plant from 50,000 M.c.f. to 100,000 M.c.f. The company is not expanding its Carthage plant, which has a capacity of 25,000 M.c.f. The sixth plant in the field is that of Lone Star Producing Co., which has an absorption capacity of 100,000 M.c.f. daily.

Peoples Gas Asks to Serve 8,000 Additional Homes

Peoples Gas Light & Coke Co., Chicago, has asked the Illinois Commerce Commission for authorization to equip 8,000 additional single family dwellings in the Chicago area with gas heating facilities after April 1.

The request comes as a result of expected completion of expanded natural-gas facilities late this winter. In order to grant the request the commission will have to modify its service limitation order on gas for space heating.

The company has added more than 16,000 residential space-heating users since early 1946 as moderate improvements were made in gas supplies. If the petition presently before the commission is granted, gas home heating will have been made available to 24,000 homes which were without it prior to 1946, and by the fall of 1949 the company hopes to increase this number to 52,000.

Gas Revenues and Sales Continue Steady Increase

Natural-gas companies have reported to the Federal Power Commission revenues amounting to $65,713,676 for October 1948, an increase of 26 per cent over the $52,166,782 reported for the same month a year ago.

Gas-utility operating income for October 1948 amounted to $8,156,743, up 31.7 per cent from the $6,195,741 reported for October 1947. Net income for the month was $8,966,165 compared to $7,107,079 reported in October 1947.

To ultimate consumers, gas sales in October 1948 were 120,978,000,000 cu. ft., an increase of 17.4 per cent over a year earlier. Sales to residential consumers increased 17.5 per cent and to commercial and industrial consumers 20.5 per cent and 15.7 per cent, respectively. Revenues from sales to ultimate consumers increased 17.5 per cent and amounted to $32,708,000. Revenues from residential and commercial consumers were up 14.4 per cent and 18.4 per cent, respectively. Revenues from industrial consumers were up 18.9 per cent.

Gas operating revenues for the 12 months ended October 31, 1948, aggregated $828,241,129, an increase of 14.6 per cent over the total of $722,544,084 reported for the preceding 12 months. Net income for the period amounted to $155,372,658, compared to $146,878,097 for the previous 12 months, or an increase of 5.8 per cent.

The book costs of gas plants of the reporting companies aggregated $2,726,440,042 on October 31, 1948, compared to the $2,427,032,817 reported a year earlier.

Natural Gasoline

N. G. A. A. to Sponsor Research Program

FORTY-ONE laboratories of 28 oil companies and three commercial laboratories have indicated that they will participate in a cooperative research program sponsored by the Natural Gasoline Association of America involving the analysis of various liquid hydrocarbon mixtures of known composition.

Objective of the entire program, according to H. A. Montgomery, Warren Petroleum Corp., Houston, and chairman of the N.G.A.A. technical committee, is to find out if through minor changes in equipment and major revisions in technique, more accurate and duplicable results can be obtained with all low temperature distillation.

First in a series of three samples prepared expressly for the program by the special products department of Phillips Petroleum Co. will soon be sent to the participating companies. The samples fall into three classifications of interest to the natural-gasoline and cycling industries. One simulates a wide range L.P.G. product, another a relatively close butane cut, and a third is a mixed petanes fraction with a small amount of contamination on both ends.

Analysis results are to be returned to N.G.A.A. Secretary William F. Lowe, Tulsa, who will identify each with a code number before forwarding them to the correlating subcommittee headed by A. J. Miller, Phillips Petroleum Co., Bartlesville, Okla.

New Stanolind Plant to Be Completed by March

Final completion of the new Slaughter natural-gasoline plant being built by Stanolind Oil & Gas Co. and now 80 per cent complete, is scheduled for March, 1 month ahead of the original construction schedule.

The new plant, which will begin operations in February, is located about 13 miles southwest of Levelland, in Hockley County, Texas, and is one of four to be completed by Stanolind in early 1949. *(For details of Stanolind's entire gasoline-plant program see The Oil and Gas Journal, March 25, 1948.*

Designed for an ultimate capacity of 120,000,000 cu. ft. of gas daily, the Slaughter plant will operate initially at 90,000,000 cu. ft. per day. Output each 24 hours will be approximately 100,000 gal. of gasoline, 100,000 gal. of butane, and 50,000 gal. of propane.

VESSEL DIVISION

NEWS

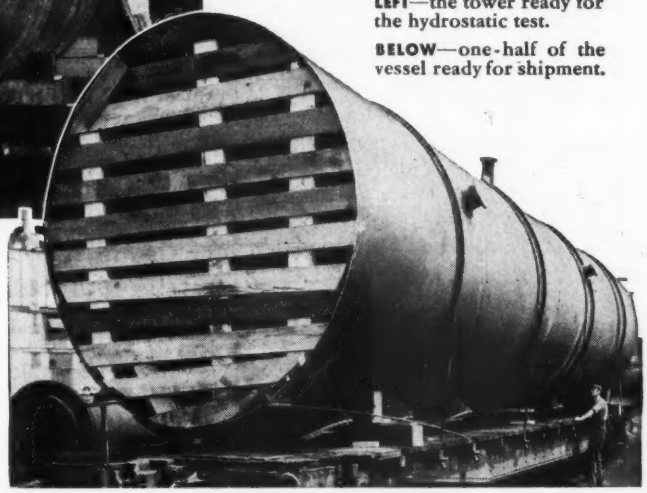
A. O. SMITH Corporation

New York 17 • Philadelphia 5 • Pittsburgh 19 • Atlanta 3 • Chicago 4
Tulsa 3 • Houston 2 • Seattle 1 • Los Angeles 14
International Division: Milwaukee 1

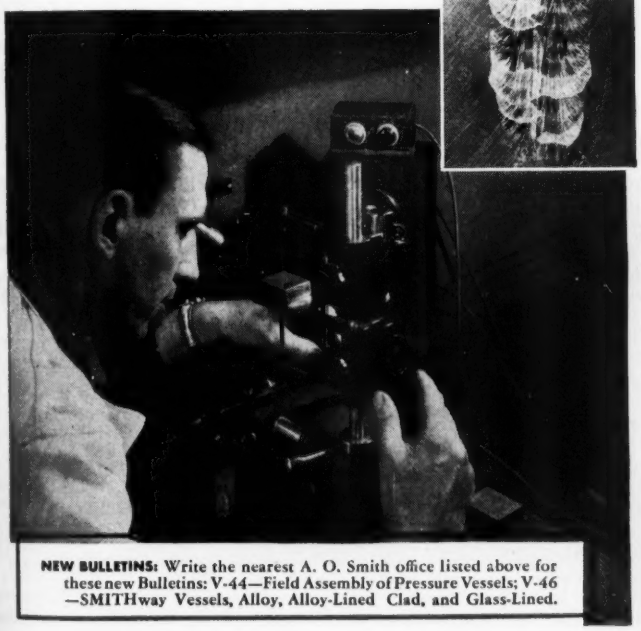
A. O. SMITH TAKES THE GUESS WORK OUT OF FIELD ASSEMBLY. Railroad shipping restrictions made it necessary to field-assemble this 11½ ft. dia. x 116 ft. long SMITHlined Fractionating Tower. To insure ease of assembly in the field, it was first manufactured and completely assembled in the A. O. Smith Milwaukee Plant, then hydrostatically tested, cut in two at the center girth seam, rescarfed for welding in the field, and shipped. Field-assembly costs were cut to a minimum with only one girth seam to be welded.

LEFT—the tower ready for the hydrostatic test.

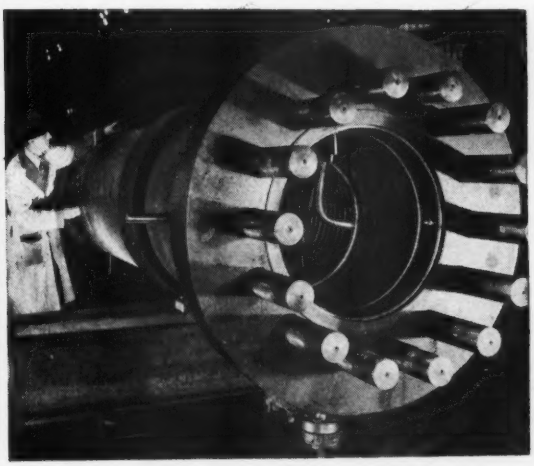
BELOW—one-half of the vessel ready for shipment.



MANY TESTS BEYOND CODE REQUIREMENTS are a regular part of A. O. Smith vessel production control procedures. Here Bill Poehlman, a 20-year veteran, in charge of spectroscopy and X-Ray research, checks the deposited weld metal composition in a vessel test plate, by means of an A. O. Smith-developed microspectrographic technique.



IN STOCKHOLM, SWEDEN, they know about the famous SMITHway welded Multi-Layer vessel construction. Here is one of two SMITHway Inconel-lined Multi-Layer Autoclaves for fatty acid service, with a shell thickness of 5 inches and an operating pressure of over 5,000 psi. This vessel was shipped direct by ocean-going ship from Milwaukee to Stockholm.



NEW BULLETINS: Write the nearest A. O. Smith office listed above for these new Bulletins: V-44—Field Assembly of Pressure Vessels; V-46—SMITHway Vessels, Alloy, Alloy-Lined Clad, and Glass-Lined.

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PIPE LINES

Atlantic Starts 382-Mile Refugio-Crane Pipe Line

Atlantic Pipe Line Co. is commencing operations for constructing a 382-mile, 10-in. line for moving crude oil from Crane in West Texas to Refugio in the Corpus Christi area on the coast. Contract for the entire pipe laying for the project has been let at the company's Philadelphia headquarters to A. C. Holder Construction Co.

The contractor is now working out of Beeville, Tex., where a field office has been established. Operations will be directly supervised by A. C. Holder. Pipe was being shipped to the project in December.

For protecting the pipe, Farberpipe, a coating with a coal-tar base, will be applied cold. No wrapping will be used with the coating.

Richmond Exploration Lays 25-Mile Maracaibo Outlet

Richmond Exploration Co. has recently completed a 25-mile crude-oil line from Boscan field to a loading point off the west shore of Lake Maracaibo, Venezuela. The contractor, Williams Brothers Co., completed pipe laying between November 16 and December 3, 1948. Construction operations were personally directed by Guy S. Connors, vice president of Williams Brothers Co., who has been in charge of the recently completed Ule-Amuay 24-26-in. Creole Petroleum Corp. line and other Williams Brothers operations in South America.

The Richmond 25-mile line consists of approximately 21.5 miles of 18-in. and 3.5 miles of 16-in. Coating was wrapped with glass and kraft paper. The line was laid with no slack; pipe was cradled into the ditch directly behind the dope machine. A hydraulic test using water from the lake has been applied at 1,200 psi.

The pipe-line system terminates at the 125,000-bbl. tanker "Rheam," moored 8,200 ft. offshore which serves as floating storage at the point where tankers are to be loaded for marine transportation operations. The "Rheam" is being fitted by another contractor with steam coils which will be completed January 18, when operation of the system is scheduled to commence.

The 8,200-ft. 18-in. line from the shore to the "Rheam" was laid by Williams Brothers in a day and submerged in 1½ hours. Sections, 1,000 ft. long, were added to the line as it was towed into the lake. Connors used radio communication in coordinating tugboat operations with those on shore.

Viscous 9°-12° A.P.I. crude oil for the line will be heated in the Boscan field to a temperature of 180° F. to facilitate movement to the "Rheam" storage.

Michigan Gas Storage Lets 75-Mile Contract

Michigan Gas Storage Co. has awarded a contract for 61 miles of 20-in. to Mahoney Contracting Co. The project will extend from the Freedom, Mich., compressor station to Laingsburg, Mich. This will comprise the southern leg of the company's 150-mile system from the Cranberry Lake-Marion field storage areas to the Freedom connection with the Panhandle Eastern Pipe Line Co. system. The contract also provides for the construction of a 14-mile spur of 12 and 20-in. between Laingsburg and Lansing, Mich. Cost of the total 75-mile job has been estimated as approximately $3,500,000.

Preliminary work started late in December. Pipe laying will begin in February on arrival of pipe from A. O. Smith Corp. Completion is scheduled for June 1, 1949.

When Michigan Gas Storage Co.'s line from the Clare County fields to Freedom Junction is completed in 1951, the 150-mile, 20-in. line will provide for transmission directly from the Panhandle Eastern line to Clare County storage.

A contract for the middle section of the line, to consist of 51 miles of 20-in. will be let in 1950; this will extend from Laingsburg north to Mount Pleasant. In 1951 a 37-mile, 20-in. line will be constructed from Mount Pleasant to storage pools; this will parallel the 16-in. laid by Mahoney in 1947.

Pittsburgh Companies Authorized New Projects

Three member companies of the Pittsburgh Group of Columbia Gas System, Inc., have been authorized by the Federal Power Commission to construct, purchase, and abandon facilities. The projects are scheduled for completion by the spring of 1949. Facilities will be used to serve pres-

How to Protect PIPE JOINTS with TAPECOAT
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It's easy to protect welded pipe joints when you use TAPECOAT . . . the modern protective coating in handy tape form.

You simply remove kraft paper on mill or machine coating, back far enough to start one spiral wrapping of TAPECOAT over mill coating. Then clean and dry the bare pipe with a torch. Next, start wrapping TAPECOAT on mill coating where kraft paper has been removed, flashing flame of torch lightly on TAPECOAT to bleed its coating, as illustrated, and permit it to conform readily to the contour of the pipe. Secure double thickness of TAPECOAT by overlapping slightly more than half the width of the tape. When wrapping is completed, flash the torch flame lightly over entire TAPECOATED section, to bleed coating to a shiny surface.

Write for complete details on this quick, clean, economical protection for pipe joints.

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ent customers and will not extend service into new markets.

The authorized projects of the three companies — Manufacturers Light & Heat Co., Home Gas Co., and Natural Gas Co. of West Virginia—are estimated at a total cost of $888,924 and are as follows:

Manufacturers Light & Heat Co. will construct approximately 10½ miles of 12-in. line from a point on an existing line near Canonsburg, Pa., to the Pittsburgh area; about 5 miles of 6-in. line in Ohio extending from Steubenville to Wintersville; two 500-lb. compressor cylinders to replace existing 100-lb. cylinders at the Waynesburg compressor station in Pennsylvania; and a 334-hp. compressor station in Marshall County, West Virginia. The company also was authorized to abandon three 125-hp. rotary-type compressors at Waynesburg station; the Monessen and Turkey Hollow compressor stations in Pennsylvania; and approximately 17 miles of 8-in. line in West Virginia and Pennsylvania; and to abandon and sell to Peoples Natural Gas Co. 5,339 ft. of 8-in. gas transmission line in Westmoreland County, Pennsylvania.

Home Gas Co. was authorized to acquire from Keystone Gas Co., Inc., an affiliate, the Dundee compressor station and storage field in Yates and Schuyler counties, New York, and to install a 300-hp. compressor station in Steuben County, New York.

Natural Gas Co. of West Virginia will construct about 5 miles of 8-in. line from the Brinker compressor station to the vicinity of Salem, Ohio.

WAA Asks Bids for 100-Mile Gas Line

War Assets Administration is inviting sealed bids for a 100-mile natural-gas system between Lake Charles, La., and several communities including Woodlawn, North Tepetate, Lakeside, and Chalkley, La. Most of the pipe is 10, 12, and 16-in. in diameter but some is 6, 14, and 20-in. The property also includes metering and dehydration stations, a two-way radio station and miscellaneous land and buildings. There is no compressor equipment. The system is now operated for the Government by Union Sulphur Co.

Bids are to be received up to 2 p.m. (EST) February 10, 1949, WAA Office of Real Property Disposal, Room 1508, Temporary Building I, Washington, D. C. Detailed information may be obtained from WAA Washington headquarters or the WAA Office of Real Property Disposal, P.O. Box 6030, Dallas.

United Begins Operating New Louisiana Gas Line

The United Gas Pipe Line Co.'s newly constructed pipe line from the

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LUBBOCK, TEXAS

West Lake Verret gas field in St. Mary Parish, Louisiana, was recently placed in operation. The line which transports fuel under Grand Lake, will augment the supply for the eastern sector of the company's Southwest Louisiana district.

The new line, which consists of 13.74 miles of 7 and 8-in. pipe, crosses not only the lake but 12 major bayous and canals and numerous small sloughs and bayous. Less than 2 miles of the line was constructed over solid terrain.

Tennessee Gas Hearing Is Postponed

The hearing previously scheduled for January 5 on the application by Tennessee Gas Transmission Co., Houston, Tex., to construct additional natural-gas transmission facilities has been postponed by the Federal Power Commission upon motion of Tennessee Gas.

The company requested postponement until April 1949 in order to allow time for conclusion of additional gas supply contracts and preparation of evidence for presentation at the hearing. FPC approved of no definite date for the hearing but said that 15 days' notice of the time and place of the hearing would be given.

Texas G.T. Stores 237 Miles Pipe for Texas-Ohio Line

Texas Gas Transmission Corp. now has 237 miles of 26-in. pipe stored along the route of the company's projected 840-mile Texas-Ohio pipe line. The company has recently completed the 63-mile, 26-in. line from Lulu, Miss., to Memphis, Tenn., contracted by N. A. Saigh Co.

Financial arrangements have been completed for issuance of $60,000,000 bonds to be purchased by a group of 12 insurance companies. A standby arrangement has been made with banks for borrowing if necessary up to an additional $7,500,000 on a term loan basis. Financing for the undertaking, which has been regarded as a $73,500,000 project, is subject to receiving a certificate of public convenience and necessity from the Federal Power Commission.

Stanolind Moves West Texas Office to Lubbock

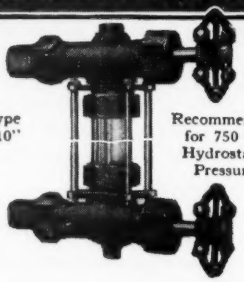
West Texas operations of Stanolind Pipe Line Co. are now directed from Lubbock, Tex., where offices have been established in a new, air-conditioned building, C. E. Wilson, area superintendent, has announced. Transfer of 15 employes and their families from the former division headquarters at Brownfield, Tex., was completed late in December.

As the new center of Stanolind Pipe Line's West Texas division, the Lubbock headquarters will direct operations that extend from the Permian basin, across the bottom of the Panhandle, to the Red River. An arm extending west to Caprock, N. M., also is in the division.

Crude oil from the West Texas area is pumped through the company's trunk lines and lines of connecting carriers to refineries in Oklahoma, Kansas City, St. Louis, and the Chicago area.

Modernization steps and additions, increasing its already extensive system, are being completed by the company.

PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



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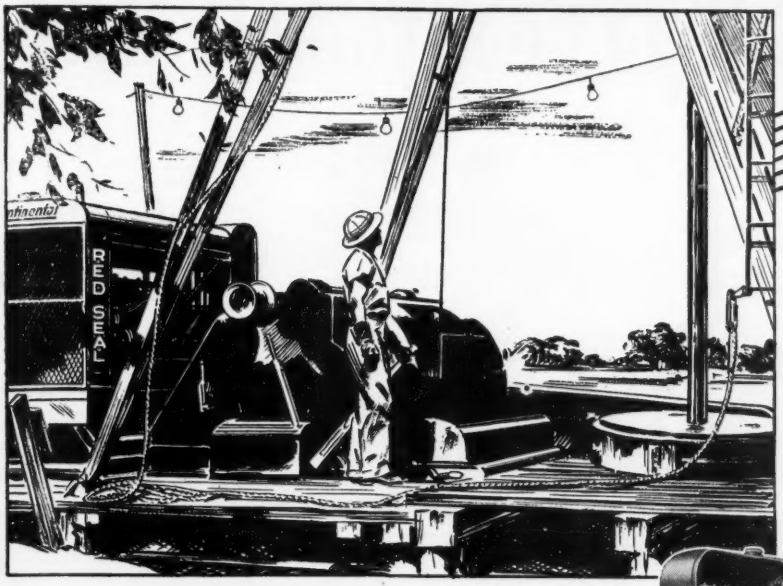

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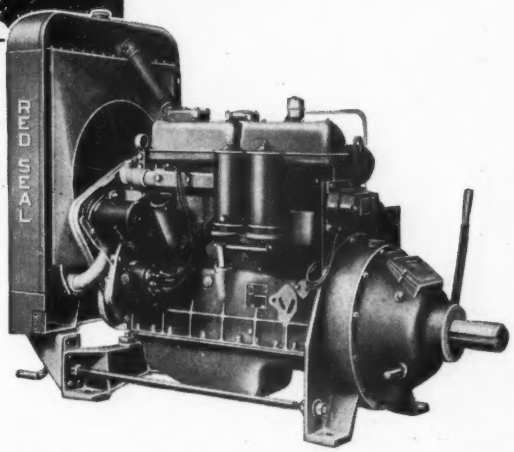

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Exploration and Drilling

1948's Influence on 1949 Developments

YOUR 1949 exploration and development program is bound to be influenced by both the ideas and areas that came into prominence during 1948. So, this is a logical time to check to see what happened in 1948 that is likely to influence your 1949 program.

First is A.A.P.G.'s Vol. 3, Structure of Typical American Oil Fields. This was deliberately designed to stimulate thinking and stretch the imagination of each reader. All the fields described are unusual, in terms of conventional thinking. It is bound to affect the 1949 thinking of some of your geologists.

Geological research is now heading rapidly in the direction of sedimentology; the study of sediments, their content, and environment. More and more of your competitors are beginning to realize that only one hit out of 50 to 100 new fields found, is a hit that opens up a really big-profit oil field. So, they are starting to hunt for the elusive "X" factor that distinguishes a 100-million-barrel or better accumulation from the run-of-mine fields. Research in sedimentology looks like the best bet to find out what "X" is.

In geophysics, the practical application of aerial magnetics began. As usual with new instruments, it soon became apparent that interpretation was vital. New surveying methods came into prominence to smash an expensive bottleneck. Rapid strides were made in radio surveying methods not limited to line of sight. Three new items of importance were unveiled; their practical importance will be tested in 1949. These were: Telluric current; S.P. curve interpretation on electric logs; and sound-wave logging.

In the list of areas opened up, Canada takes first rank. The developments at Leduc-Woodbend, the discovery of Redwater, and promising signs in the Hanna area combine to open up the whole Alberta trough. Call it roughly 650,000 sq. miles of promising territory. Then comes the apparent success of new geophysical techniques in unraveling the overthrust area along the mountain front at Pincher Creek.

International affairs and military policies will probably be affected by, and in turn react on oil development in Canada. Such considerations might be powerful influences for allocation of steel for pipe lines and development of oil to the extent of at least an additional 250,000 bbl. daily in Canada as rapidly as possible.

The Canadian overthrust area referred to also extends south into Montana, and the lease play is pretty hot. The 1948 successes in Central Montana on the Big Snowy anticlinorium are certainly going to affect 1949 activities there.

Wyoming saw Powder River basin come to life in 1948 on both east and west sides. The Poison Spider strike in the Wind River basin, at a depth of 14,307 ft., but only 4 miles from the surface outcrop of the producing formation, is making geologists think.

Three oil strikes in rapid succession will bring Utah into the 1949 picture in a big way. Pipe-line prospects and exploration successes make the four-state corner area of New Mexico-Colorado-Utah-Arizona look bright.

California gets a widening of horizons by the prospects in the trend from the Cuyama Valley to the Salinas Valley. Offshore developments at Santa Barbara County may come into more prominence.

The offshore play in the Gulf of Mexico began to show signs of success, and is of tremendous potential importance, if costs can be reduced and political complications kept at a minimum.

In the Permian basin, developments in pre-Permian off the Central Platform in deeper parts of the basin expand prospects. The same is true of the successes along the west flank of the Bend Arch in the transitional area near the east edge of the Midland Black Shale basin.

The southeast end of the Anadarko basin begins to unravel its geological secrets and show lots of oil already found and more to be found in 1949.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—Lion Oil Co. increased the oil yield of its Scurry County Pennsylvanian discovery by acid treatment. The well flowed 189 bbl. of oil in 12 hours after drilling plug, then flowed at the rate of 55 bbl. an hour after acidizing. Operators were still flowing to test, but planned to perforate another 20 ft. above 6,585 ft. Benedum had its sixth Ellenburger completion this week. Richardson & Bass prepared to complete its 1 Neal, northwest of Benedum, which gaged more than 100 bbl. of oil in 6 hours.

CANADA.—Hanna Petroleums' basal Cretaceous discovery flowed 32°-gravity oil at the rate of 360 bbl. per day from perforations at 3,700-13 ft. in the Sunburst sand. Imperial Oil's Redwater 5 extended that field's D3 production, and British-American and Leduc Leaseholds, Ltd., scored a D2 success at their joint Leduc extension venture.

SOUTH LOUISIANA.—Humble Oil & Refining Co. has run tubing and production packer to test oil sands at its 1 Pelican Island State Lease Account 1, Block 30, wildcat 9 miles off the coast of Plaquemines Parish.

MID-CONTINENT.—Grant County, Oklahoma, has a Wilcox sand discovery well at Mid-Continent Petroleum Corp. et al 1 Vollmer, C NE NE 1-25n-5w. Operator has set casing after getting an estimated 30 bbl. per hour on a drill-stem test at 5,831-46 ft. Gas was estimated at 1,000,000 cu. ft. per day.

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Do jammed valves, leaky pistons, and scored piston rods "eat up" your profits by reducing slush pump efficiency and increasing shut-down time?

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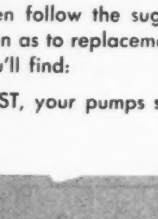

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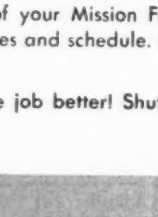

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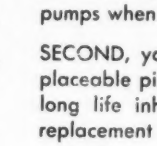

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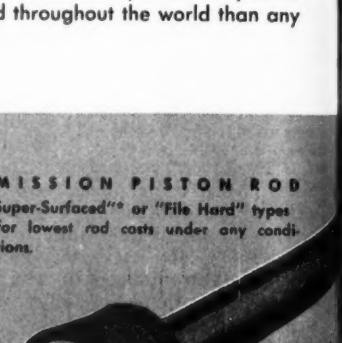

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OKLAHOMA

Grant County Gets New Wilcox Discovery

MID-CONTINENT PETROLEUM CORP. and Viersen-Cochran have set casing at their Grant County Wilcox-sand discovery 1 Vollmer, C NE NE 1-25n-5w, following a good showing of oil on a drill-stem test. The well made an estimated 30 bbl. per hour on a 17-minute test at 5,831-48 ft. and recovery was 775 ft. of oil in spite of the fact that the well unloaded while the tool was being pulled. There was no water included in the recovery and gas was estimated at 1,000,000 cu. ft. per day.

Foster Drilling Co. has a prospective Bartlesville discovery well in the northern part of Lincoln County at 1 Deacon, NE NE SW 25-17n-5e. A 35-minute drill-stem test at 3,400-40 ft. had gas in 13 minutes and recovered 180 ft. of oily mud with no water. Operator will run casing.

In the southeastern part of Lincoln County, J. M. Huber Corp. has the makings of a Wilcox well at 1 Tierney, NE NE NW 30-12n-6e, a renewal. The well was originally drilled to depth of 4,202 ft. and on renewed drilling, the Wilcox was called at 4,700 ft. A drill-stem test at 4,697-4,711 ft. had gas in 30 minutes and flowed while the drill pipe was being broken down. Casing was set at 4,692 ft. and the well swabbed 7 bbl. per hour.

The third well drilled in Southeast Ramsey pool (the second was dry) is showing for a Skinner sand producer. The well 3 Blumer, NW SW SE 28-18n-2e, Payne County, blew out when the plug was drilled and is now being produced through casing in an attempt to reduce pressure. The hole was carried to 4,317 ft. and casing set at 4,310 ft.

Also in Payne County, The Texas Co. 1-J State School land, NE NE NE 36-19n-3e, is running casing after good recovery on a 90-minute drill-stem test. The test, made at 3,756-67 ft., had gas in 13 minutes and recovered 430 ft. of 38.3°-gravity oil and 302 ft. of oil-cut mud.

Magnolia Petroleum Co. is testing two wells in the unitized North Cement pool in Caddo County. Magnolia 2 Unit, C NW SW 13-6n-9w, had the Marchand at 10,650 ft. Casing was perforated at 10,795-10,835 ft. and operator is preparing to run tests. Magnolia 3 Unit, C NW SW 11-6n-9w, topped the Marchand at 10,655 ft. and set casing at 10,908 ft. Perforations at 10,828-70 ft. resulted in recovery of 125 ft. of oil and 565 ft. of drilling mud on a 50-hour test. A drill-stem test through perforations at 10,780-10,812 ft., open for 15 hours, had a blow of gas.

OKLAHOMA SUCCESSFUL WILDCATS

Beckham County: Union Producing Co. 1 D. D. Music, SE NW 25-10n-21w, 237 bbl. of 63°-gravity distillate from 9,648-62 ft.; Kansas City 8,873 ft., TD 9,708 ft.

Garvin County: The Texas Co. 1 J. A. Donham, NE NE NW 22-4n-3w, 70 bbl. of 56°-gravity distillate from sand at 6,772-90 ft.; TD 8,049 ft.

Stephens County: Kerr-McGee Oil Co. 1 Heanette, SE SE NW 25-2s-7w, 71,185,000 cu. ft. of gas from 2,643-2,760 ft.; Viola 2,685 ft., TD 2,939 ft.

OKLAHOMA WILDCAT FAILURES

Alfalfa County: Smith Bros. Drilling Co. 1 Newlin, C SW SE 19-25n-12w, dry, TD 7,113 ft., Pawhuska 3,522-3,825 ft., Tonkawa sand 4,220-75 ft., Avant-Dewey 4,525 ft., upper Layton 4,815 ft., lower Layton 5,298 ft., Checkerboard 5,350 ft., Oswego 5,550 ft., Bartlesville 5,822 ft., Mississippi lime 5,936 ft., Kinderhook 6,635 ft., Woodford 6,667 ft., Hunton 6,718 ft., Sylvan 6,768 ft., dolomite 6,818 ft., Viola 6,870 ft., Simpson dense 6,878 ft., Wilcox 7,026 ft., second Wilcox 7,094 ft.

Carter County: W. H. Smith 1 fee, SW SE SW 5-4s-2w, dry, TD 4,101 ft., basal Pontotoc 960 ft., sands 1,828-56 ft., 2,418-2,508 ft. and 2,625-58 ft.

Comanche County: Sam W. Horton 1 E. B. Clinton, NE NE SE 2-1n-11w, dry, TD 242 ft., sand with slight show of oil 234-40 ft.

Garvin County: Republic Natural Gas 1 Thompson, NW NW NE 19-2n-2w, dry, TD 7,840 ft., first Checkerboard 6,300 ft., second Checkerboard 6,482 ft., Springer 7,355 ft., Mississippian-Caney 7,670 ft.

Haskell County: LeFlore County Gas Co. H-8 E. F. & C. Huff, C SW SW 19-9n-19e, dry, TD 4,767 ft., Hartshorne sand 215 ft., Atoka sand 380-462 ft. with slight show of gas, basal Atoka sand 3,436-52 ft. with estimated 1,000,000 cu. ft. of gas, lime 4,324 ft., sandy shale 4,413 ft., lime 4,448 ft., sand 4,516 ft., sandy lime 4,536 ft., sand 4,665 ft.

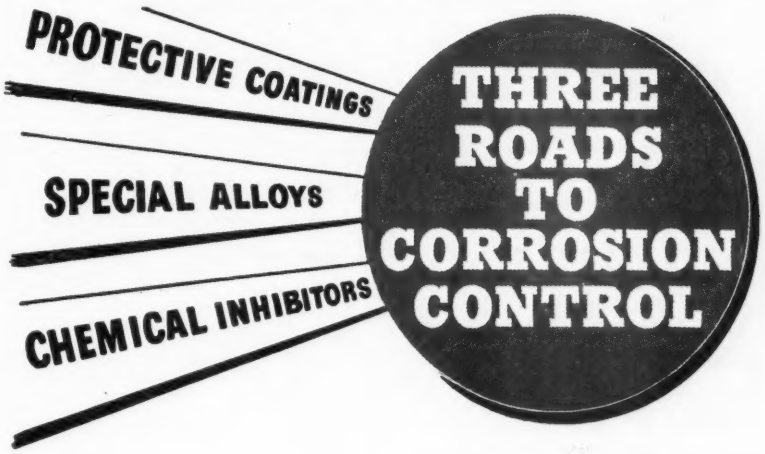
Hughes County: Mid-Continent Petroleum 1 Peggy Goat, NW SW NE 25-7n-8e, dry, TD 3,917 ft., lower Wewoka 505 ft., upper Calvin 690 ft., middle Calvin 865 ft., lower Calvin 930 ft., Earlsboro 3,432 ft., Booch 2,965 ft., Gilcrease 3,377 ft., Union Valley 3,810 ft., Cromwell 3,827 ft.

Jackson County: McCasland and Wilcox Oil Co. 1 Edwards, NW NW NE 9-3n-21w, dry, TD 4,413 ft., heavy wash 3,503 ft.

Murray County: McDaniel & Guffy 1 Guffy, NE NE SW 21-2n-3e, dry, TD 1,992 ft, shaly sand 1,100-10 ft. and 1,140-42 ft.

Noble County: Callery & Hurt 1 Wiegel, SW NW NE 28-20n-1e, dry, TD 5,400 ft., Mississippi lime 4,774 ft., Woodford 5,074 ft., Misener 5,078 ft., Sylvan 5,082 ft., Viola 5,153 ft., Wilcox 5,232 ft., second Wilcox 5,290 ft.

Pawnee County: Clark C. Nye 1 Craddock, SE SW SW 14-23n-5e, dry, TD 3,118 ft., Checkerboard 2,400 ft., Oswego 2,563 ft., Verdigris 2,855 ft., Burbank 2,915-3,020 ft., Mississippi chert 3,095 ft.



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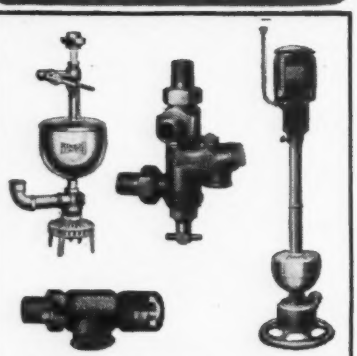

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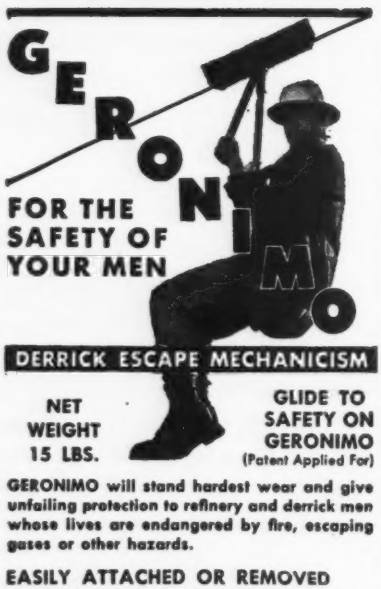

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B. B. Blair 1 Welker, SE NE SW 23-23n-5e, dry, TD 2,984 ft., Oswego 2,592 ft., Verdigris 2,887 ft., Skinner 2,897 ft., Burbank 2,961 ft.

Seminole County: Sohio Petroleum et al 1 V. V. Harris, NW NW SW 31-5n-6e, dry, TD 1,583 ft., Senora sand 1,565 ft.

Stephens County: Mid-Continent Oil 1 Will Edwards, NW NW SE 14-3s-6w, dry, TD 3,519 ft., Hoxbar 1,660 ft., Arbuckle 2,795 ft.

Skelly Oil Co. 1 Browning, SW NE SW 14-1n-4w, dry, TD 7,007 ft., Hoxbar 2,415 ft., Deese 5,076 ft., unconformity 5,928 ft., sand 6,330 ft., Springer 5,928 ft., basal Simpson 6,414 ft.

KANSAS

Rooks County Wildcat Has Arbuckle Show

SAM K. PACK and Braden & Green Drilling Co. had a 100-ft. fillup of oil after drilling plug at 1 Griebel, NE NE NW 8-7s-19w, Rooks County. The Arbuckle was topped at 3,438 ft. and casing set at 3,446 ft., 10 ft. off bottom. Operators are planning to treat the pay with 500 gal. of acid.

In the section to the southeast, the same operators have set casing at 1 Schruben, SW SW SW 16-7s-19w, after finding porosity and saturation in the Arbuckle, topped at 3,433 ft. Casing was set at 3,436 ft. and hole drilled to a total depth of 3,441 ft.

The Barton County wildcat, Bay Petroleum Corp. 1 Schartz, SW SW SE 7-20s-12w, pumped 118 bbl. of oil in 24 hours from the Lansing through perforations at 3,230-34 ft. following treatment with 1,000 gal. of acid. Casing was set at 3,424 ft. for tests of the Arbuckle, but the well swabbed only 1 bbl. of oil and 1 bbl. of water from this zone and was plugged back.

In the section to the north, Mouser Drilling Co. is preparing to acidize the Lansing at 1 Fransen, NW SE NW 6-20s-12w. This zone had a recovery of 175 ft. of oil on an early drill-stem test and a show of oil on tests through perforations at 3,176-89 ft. The Lansing was called at 3,162 ft. and casing was set to 3,250 ft. Total depth is 3,461 ft., 9 ft. in the Arbuckle.

W. P. Faulkner et al 1 Gates, NW NW NW 3-22s-13w, Stafford County, had porosity and saturation in the Arbuckle and casing has been set on top of the formation at 3,747 ft. Total depth is 3,751 ft. If productive, the well will extend Northwest Drach pool by about ½ mile to the northwest.

Skelly Oil Co. has completed 1 Parker, SE SE NW 18-15s-12w, Russell County, with a potential of 23 bbl. per day from the Arbuckle at 3,260-70 ft. to open Parker pool. The well is between the southeastern tip of Hall-Gurney pool and Trapp pool.

For the week, a total of 69 new locations were announced. Barton County led with 14 new spots followed by Rice with 11 and by Butler and Rooks with 8 locations each.

KANSAS SUCCESSFUL WILDCAT

Barton County: Ben Brack Oil Co. 1 Wright, NE NE SW 32-20s-13w, pumped 190 bbl. of oil per day from Arbuckle 3,545-61 ft; anhydrite 775 ft., Lansing 3,293 ft., TD 3,561 ft.

KANSAS WILDCAT FAILURES

Barber County: M. B. Armer et al 1 Pfaff, NW SE NE 15-34s-10w, dry, TD 5,315 ft., Elgin sand 3,412 ft., Toronto 3,588 ft., Kansas City 4,144 ft., Mississippi 4,634 ft., Viola 4,998 ft., Simpson shale 5,081 ft., Simpson sand 5,088 ft., Arbuckle 5,265 ft.

Barton County: Derby Oil Co. 1 Grizzell, SE SW NW 11-18s-11w, dry, TD 3,360 ft., Lansing 3,041 ft., cherty conglomerate 3,314 ft., Arbuckle 3,344 ft.

Ben Brack Oil Co. 1 Ludwig, SW SW NE 16-20s-13w, dry, TD 3,590 ft., anhydrite

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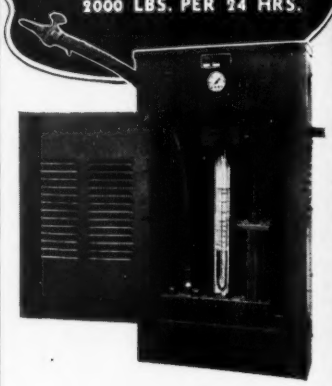

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HOUSTON

725 ft., Topeka 2,878 ft., Arbuckle 3,537 ft.

Ellis County: Westgate-Greenland Oil Co. 1 Hall, SE SE SW 6-12s-16w, dry, TD 3,524 ft., anhydrite 1,070 ft., Lansing 3,126 ft., Heebner 3,078 ft., conglomerate 3,419 ft., Arbuckle 3,492 ft.

Marshall County: Aladdin Petroleum and Thrifty Drilling et al 1 Rombeck, NW SW SW 34-3s-7e, dry, TD 1,915 ft., Topeka 960 ft., Kansas City 1,170 ft., Hunton 1,632 ft.

Ness County: Cooperative Refinery Association 1 McKinley "A," NE NE NE 19-17s-24w, dry, TD 4,516 ft., anhydrite 1,680 ft., Heebner 3,714 ft., Lansing 3,794 ft., basal Pennsylvanian conglomerate 4,346 ft., Mississippian 4,409 ft.

Reno County: J. M. Huber Corp. et al 1 Stanley, SE SE NE 34-24s-10w, dry, TD 4,290 ft., Heebner 3,171 ft., Lansing 3,409 ft., Mississippian 3,840 ft., Viola 4,077 ft., Simpson 4,182 ft., Arbuckle 4,252 ft.

Rice County: Alpine Oil & Royalty Co. 1 Johnson Estate, NE NE NE 28-20s-8w, dry, TD 3,505 ft., Lansing 2,862 ft., conglomerate 3,221 ft., Misener 3,295 ft., Viola 3,344 ft., Simpson 3,378 ft., Simpson dolomite 3,414 ft., Arbuckle 3,445 ft.

Stafford County: George Johnston et al 1 Westafer, NE NE NE 17-21s-12w, dry, TD 3,532 ft., anhydrite 655 ft., Lansing 3,226 ft., conglomerate 3,446 ft., Simp- 3,461 ft., Arbuckle 3,378 ft.

SOUTHWEST TEXAS

Frio County Gets Austin Chalk Discovery

CORPUS CHRISTI.—Humble Oil & Refining Co. 1 Frank Doering, new oil discovery well in the Doering area of Frio County, has been gaged at the rate of 80 bbl. of oil per day through a 3/8-in. choke. Production is from open hole at 5,504-5,776 ft. in the Austin chalk. Total depth is 6,645 ft. in Edwards lime, with plugged-back depth at 5,776 ft. The well also showed good for gas production in the Navarro sand from 4,072-4,110 ft. The well is located in Block 4 of D. D. Harrigan's Leona Valley farm subdivision, Oscar Crawford Survey 10.

Humble B-3 Kenedy discovery gas well at Sarita field, Kenedy County, has been reworked and recompleted for oil production in a shallower sand. The new completion is through perforations at 4,611-21 ft., and gaged 76 bbl. of net oil plus 19 bbl. salt water per day through a 1/8-in. choke. Tubing pressure 740 psi., casing sealed; with gas-oil ratio 940, and gravity 37.4°. Original completion was through perforations at 5,894-5,909 ft. for 13,500,000 cu. ft. of gas per day with considerable condensate. Total depth is 10,342 ft., with 5½-in. casing set to 7,903 ft. Well is located in El Paistle Grant, 3 miles northeast of the town of Sarita.

Atlantic Refining Co. 1 A. C. Gandy, a southwest extension test at the North Minnie Bock field, Nueces County, promises to extend oil production approximately 1 mile southwestward, having recovered 1,049 ft. of 34.9°-gravity oil plus 1,000-ft. water cushion and 60 ft. of oily mud, no salt water, on drill-stem test made at 7,008-15 ft. through ¼-in. chokes, with 5½ psi. working pressure. After this test, the hole was drilled and cored to total depth of 8,206 ft. The 5½-in. casing was run to 7,096 ft. to perforate the 7,000-ft. zone for completion. This well is in Geo. H. Paul's subdivision of Driscoll Ranch.

Humble 2 Robert J. Kleberg, outpost test approximately 1½ miles east of the Boedeker gas field, in Brooks County, has been completed for a shallow gas producer through perforations at 1,860-70 ft., flowing at the rate of 2,200,000 cu. ft. of gas per day on open flow. Total depth is 7,923

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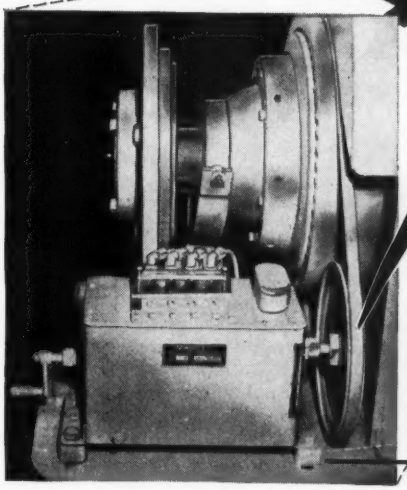

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ft. and 5½-in. casing set to 7,918 ft. Completion is made through perforations in the 10¾-in. casing which was set to 3,040 ft. The well is in La Noria de Tio Ayola Grant, 13 miles south of Falfurrias.

There were 26 locations reported for Districts 1 and 4, of whch 8 are wildcat starts, 2 in Jim Hogg and 1 each in Caldwell, Cameron, Dimmit, Guadalupe, Kinney and McMullen counties. There were 14 wildcat failures reported, 3 each in Webb and Zapata, 2 in Duval, and 1 each in Caldwell, Frio, Jim Hogg, McMullen, Milam, and Nueces counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Caldwell County: Ellmag Oil Corp. 1 R. L. French, in E. Curtis Sur., 4½ mi. N of Luling townsite, dry, TD 2,505 ft.

Duval County: American Republics Corp. 3 The Duwell Co., in J. Poitevent Sur. 549, 3 mi. N of Rosita, dry, TD 2,478 ft.

Flour Bluff Oil Corp. and Cox & Hamon 1 Johnnie Brooker Stegall et vir, in BS&F Sur. 91, 2½ mi. NE of Terancahua field, dry, TD 3,576 ft.

Frio County: Sun Oil Co. 1 G. F. Tealson et al, in T. H. Thompson Sur. 2, 3 mi. SE of Pearsall, dry, TD 4,800 ft.

Jim Hogg County: Amerada Pet. Co. 1 Lorine Jones Lewis, in Agua Nueva de Arriba Grant, 15 mi. S of Hebbronville, dry, TD 5,507 ft.

McMullen County: Amman & McNab, Ltd., A-8 Annie Graves Dolph et al, in Herman Pressler Sur. 6, 17 mi. SE of Tilden, dry, TD 1,434 ft.

Milam County: Danciger Oil & Refg. Co. 1 A. K. Campbell, in James Lewis Sur., 6.3 mi. SE of Thorndale, dry, TD 3,603 ft.

Nueces County: Woods Drilling Co. 1 R. H. Dennis, in Lot 3, Wade Riverside Subd., 15 mi. W of Corpus Christi, dry, TD 8,010 ft.

Webb County: Amerada Pet. Corp. 2 Mary A. Yeager, Sur. 105, 10 mi. W of Hebbronville, dry, TD 3,605 ft.

Stanley G. Marshall & Clyde C. Marshall 1 Marshall Bros. & Marion C. Ball et al, in HE&WT RR Co. Sur. 821, 3½ mi. SW of Bruni, dry, TD 2,616 ft.

Harry E. Murray 2-A Mabel Adami, in Sur. 337, 1¼ mi. S of Adami field, dry, TD 1,215 ft.

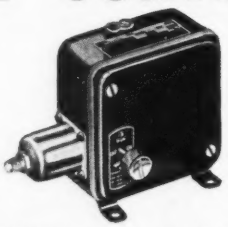
Zapata County: Bridwell Oil Co. and W. C. McBride, Inc., A-3 Robert Hinnant, in Sur. 112, dry, TD 1,626 ft.

Frank Doyno 1 Serapio Vela, in Sh. 4, El Grullo Grant, 32 mi. N of Roma, dry, TD 1,406 ft.

Joe Stelizig et al 1 C. Bustamante Heirs, in Las Comitas Grant, Dry, TD 1,790 ft.

PENN SAFETY CONTROLS

Oil Pressure Control. Dependably protects engine from possible damage caused by oil pressure failure, resulting from clogged or broken oil lines, oil pump breakdown or low oil level. Made in 3 and 4 wire; single and double pole.



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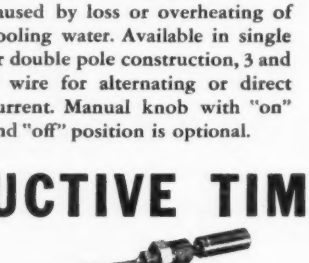

Write for detailed information on Penn safety controls. Ask for Bulletin E-100B.
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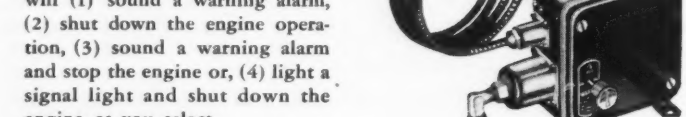

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

EASTERN TEXAS

Danciger Test Shows Oil On Short Drill-Stem Test

DALLAS.—Danciger Oil & Refining Co. 1 New Birmingham Development Co., Cherokee County wildcat 4½ miles northwest of Alto, was drilling ahead below 5,540 ft. in shale after making a slight show of oil on a drill-stem test of the Woodbine. The 10-minute test, from 5,344-53 ft., using ¼-in. chokes and no water, produced a good blow instantly and recovered 90 ft. of drilling mud very lightly oil cut, plus 1,440 ft. of salt water. It is a Woodbine test, originally scheduled to 5,400 ft. Top of the formation was logged at 5,349 ft., with elevation of 561 ft. First oil-stained sand was cored from 5,348-50 ft.

Standard Oil Co. of Texas completed its 1 Acker, Cherokee County Travis Peak test, as a distillate well in the Rodessa, extending production from that zone approximately 1 mile south-southeast from its 1 New Birmingham Development Co. discovery. After several weeks of testing, at plugged-back depth of 8,655 ft., the well made a daily potential of 10,250,000 cu. ft. of gas a day, plus 25 bbl. of water-white distillate a day and a slight amount of brackish water, from perforations at 8,610-50 ft.

In Freestone County, operations continued at Humble Oil & Refining Co. 1 R. P. McWatters. Swabbing tests of perforations at 10,614-652 ft., with fluid level ranging from 9,200-9,400 ft., recovered drilling mud with a slight amount of gas. Total depth was 16,347 ft. in shale and salt. New plug was spotted from 10,670-470 ft., and operators were waiting on cement.

Two wells were ready for completion in the new Mitchell Creek field of Hopkins County this week. Shell Oil Co., Inc., 1 Glover, Halyard Survey, northwest of the discovery, pumped 71 bbl. of oil a day, plus some salt water, from the Paluxy at 4,497-4,551 ft. The same company's 2 Hedrick, Wasterman Survey, also northwest of the discovery, had no water in pumping 205 bbl. of oil a day at 4,480-4,530 ft.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURES

Cass County: Placid Oil Co. 1 Mrs. Woodie Irvin, James Forister Sur., 7 mi. N Hughes Springs, dry, TD 5,716 ft., Tokio 3,510 ft., Georgetown 4,250 ft., elev. 338 ft.

Hopkins County: A. O. Phillips 1 Bert W. Davis, W. H. King Sur., A-1,152, 1½ mi. S Nelta, dry, TD 4,890 ft., Woodbine 3,415 ft., Comanche lime 4,095 ft., Paluxy 4,759 ft., elev. 470 ft.

Upshur County: W. W. Connell 1 J. H. Vessels estate, J. B. B. Davenport Sur., 8 mi. NW Gladewater, dry, TD 5,430 ft., Woodbine 3,811 ft., Georgetown 4,175 ft., by samples, elev. 350 ft.

Hunt County: Bert Fields 1 Harry Meredith, W. C. Schults Sur., 8 mi. E Quinlan, dry, TD 4,808 ft., Austin 2,045-2,520 ft., Woodbine 3,055 ft., Goodland 4,525 ft., Paluxy 4,590 ft., elev. 460 ft.

APPALACHIAN FIELD

Wood County Test Runs Casing

PITTSBURGH.—In Steele district, Wood County, West Virginia, United Carbon Co. 1-1582 Godfrey L. Cabot, Inc., Kerr Tract, wildcat a short distance north of the Waterbury discovery well, ran 13-in. casing at a depth of 723 ft. This well is on the Bellville Quadrangle 2.3 miles south of Latitude 39 degrees, 5 minutes and 0.05 mile west of Longitude 81 degrees, 35 minutes, on the waters of Pond Creek, starting at an elevation of 733 ft. In Portland district, Preston County, Hope Natural Gas Co., 9315 P. S. Pyles, deep wildcat, encountered a fishing job at 692 ft. A good gas well was brought in in Harts Creek district, Lincoln County, United Fuel Gas Co. 6401 fee, gaging 2,510,000 cu. ft. per day in the Salt sand, Berea sand and shale.

New locations in West Virginia were 11, located in Southwest district, Doddridge County, Cabin Creek district, Kanawha County, and Steele district, Wood County.

In Derry Township, Westmoreland County, southwest Pennsylvania, Peoples Natural Gas Co. 4-3814 Camilla Giffin is drilling at 7,911 ft., 619 ft. below the top of the Oriskany sand. In Unity Township, the same company's 1-3830 William Piper is drilling at 5,452 ft. In Shade Township, Somerset County, this company's deep test, 1-3725 R. F. Grove, is drilling at 9,280 ft., 154 ft. below the top of the Oriskany sand.

One new location was reported in southwest Pennsylvania, in North Buffalo Township, Armstrong County.

MISSISSIPPI

Six Field Wells Mark Week's Activities

JACKSON.—The LaGrange field of Adams County received three oil producing wells this week. Cities Service Oil Co. 6 Syers (Roseland Plantation), 82-7n-2w, was completed through perforations at 6,228-32 ft., flowing an initial production of 165 bbl. per day through a 12/64-in. choke. Kemp-Gilster-Vaughey-Hodge 5 Craig Estate, 82-7n-2w, total depth 6,303 ft., flowed an initial production of 127 bbl. per day through 3/16-in. through perforations at 6,214-22 ft. Sohio Petroleum Co. 3 Parker-Baker-Lot 175, 34-6n-2w, flowed 120 bbl. per day through 10/64-in. choke, 43.5°-gravity, perforations at 6,227-30 ft., with total depth at 6,229 ft.

Southern Oil Corp. 1 Moss, 33-10n-13w, in Soso field, Jones County, was completed as a gas well flowing 1,058,000 cu. ft. of gas in 24 hours plus 9 bbl. of condensate, using 3/16-in. choke, tubing pressure 1,900 psi., bottom-hole flowing pressure 2,362 psi.

In Yellow Creek field, Wayne County, Humble Oil & Refining Co. 13 G. M. & O. Land Co., 14-9n-8w, pumped 36 bbl. of 18.8°-gravity oil through perforations at 5,093-5,102 ft., and 5,168-78 ft. Total depth is 5,184 ft.

The California Co. 3 Brookhaven Unit, Tract 263, 31-8n-7e, Brookhaven field, Lincoln County, was completed on pump with initial production of 225 bbl. per day. Total depth is 10,425 ft., with perforations at 10,402-16 ft.

Seven new locations were reported this week; one a wildcat start in Rankin County. The 6 development locations are 1 each in Cranfield field, Adams County; Gwinville field, Jefferson County; Heidelberg field-West, Jasper County; LaGrange field, Adams County; Mallalieu field, Lincoln County; and Yellow Creek field, Wayne County. Four wildcat failures were completed, 1 each in Adams, Rankin, Sharkey, and Washington counties.

MISSISSIPPI WILDCAT FAILURES

Adams County: Bennett Brothers 1 Mae Hodges et al, Center NW SW 8-6n-4w, dry, TD 10,707 ft. Top Wilcox 4,335 ft., Midway 7,660 ft., Austin 9,480 ft., Base Austin 9,756 ft., Tuscaloosa 9,895 ft., Lower Tuscaloosa 10,500-690 ft., Lower Cretaceous 10,705 ft.

Rankin County: Shell Oil Co. 1 H. T. Eliliott, NE SW 11-5n-2e, dry, TD 5,600 ft.

Sharkey County: Amerada Petroleum Corp. 1 Panther-Burn Plantation, NE NE 12-14n-7w, dry, TD 4,416 ft. Top Wilcox 1,555 ft., top chalk 3,500 ft., sand 3,643-3,770 ft., Igneous 3,770-4,416 ft.

Washington County: C. H. Murphy & Co. 1 G. A. Wilson, SW SW 8-15n-7w, dry, TD 3,879 ft.

SOUTH LOUISIANA

Offshore Well to Test Shallow Sand Pay

NEW ORLEANS.—Humble Oil & Refining Co. 1 Pelican Island State Lease Account 1, Block 30, a wildcat 9 miles out in the Gulf of Mexico, Plaquemines Parish, has run tubing and production packer to 2,130 ft. to test oil sands through perforations from 2,148-2,162 ft. Total depth is 7,500 ft. The 5½-in. casing was cemented to 7,500 ft., but cut and pulled in order to test the shallow sands behind the string of 9⅝-in. casing, which is cemented at 2,572 ft. Salt was topped at 2,983 ft.

A new sand for Iowa field, Calcasieu Parish, was opened by Magnolia Petroleum

PARAFFIN'S NO PROBLEM

when your sucker rods are equipped with

HUBER SCRAPERS

Paraffin can't accumulate in the tubing when your sucker rods are equipped with Huber Scrapers. NO PARAFFIN . . . NO TROUBLE . . . NO REMOVAL COSTS!

Huber Scrapers, shrink-fitted to new or used sucker rods, scrape paraffin from the tubing wall as the string rotates and reciprocates. This constant scraping prevents paraffin accumulation . . . eliminates paraffin removal.

Huber Scrapers quickly pay for themselves. Wells requiring paraffin removal every week or ten days have been on production for months without paraffin trouble after Huber Scrapers were installed.

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This rod hanger rotates the rod string a fraction of a turn on each reciprocation. The horizontal teeth on the turn table are engaged by two ratchet levers which are actuated by a flexible steel cable attached to the walking beam. On each reciprocation the levers move the rod string a fraction of a turn.

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PRODUCTION TOOLS by Baird
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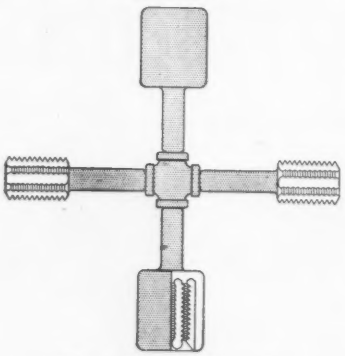
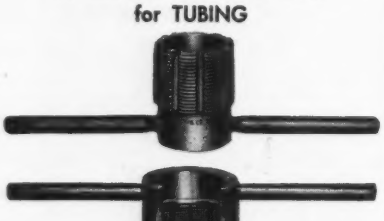


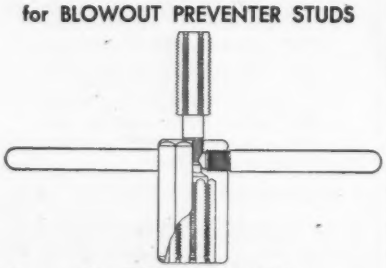
⅝" — ¾" — ⅞" — 1"

CLEAN OUT TAP and DIES for TUBING



2" to 4" PLAIN and EUE ROUND and V-THREAD

CLEAN OUT TAP and DIES for BLOWOUT PREVENTER STUDS



⅝" THRU 2" — API

Patent No. 2110618

BAIRD MFG. CO.—TULSA

Co. 1 E. L. Scott, with top of sand at 8,710 ft. Drilled to a total depth of 11,506 ft., the well flowed an initial production of 100 bbl. of oil per day though a 1-in. choke, tubing pressure 150 psi., casing pressure 1,000 psi., gravity 38.4°. Production is through perforations at 8,710-14 ft.

The Texas Co. 20 State-Terrebonne Bay, Lease 301, in Caillou Island field, Terrebonne Parish, has been completed for an initial production of 229 bbl. of oil per day, 40.7°-gravity oil, through perforations at 9,508-34 ft. Top of sand 9,508 ft., and total depth 10,449 ft. Tubing pressure 1,500 psi.

There were 17 new locations reported for South Louisiana this week with only one wildcat start in St. Charles Parish. One wildcat failure was reported in Allen Parish.

SOUTH LOUISIANA WILDCAT FAILURE

Allen Parish: Frank W. Michaux 1 J. A. Bel et al, 21-6s-7w, 1½ mi. W of Reeves townsite and 7½ mi. NW of Indian Village production, dry, TD 7,225 ft.

MICHIGAN

Western Rim of Basin Gets New Dundee Pool

MOUNT PLEASANT. — Producing oil at the rate of 10 bbl. an hour from the Dundee after acidizing with 1,000 gal., Welsh Oil Co. 2 Munger, NE NE NE 18-15n-18w, Oceana County, offered prospect of a new Dundee oil field on the western rim of the Michigan basin. Production is from the Dundee at a total depth of 2,167 ft.

In September of this year, Welsh had deepened the 1 Munger, SW SW SW 8-15n-18w, from a temporary abandonment point in the Traverse lime to the Dundee and into a potential oil pay, but this wildcat has not been developed into a commercial producer, although some oil was recovered following acid treatment. Operators plan to rework the 1 Munger.

The new strike, in Golden Township and just short of a half mile east of the Lake Michigan shore, is located about an equal distance north of the Stony Lake Traverse oil field and south of the Pentwater field to the north. Bulk of the acreage around the strike is owned by the Carter Oil Co.

E. Edwin Brehm 1 Lathimer, Akron field outpost, Tuscola County, had produced about 370 bbl. of oil from the Dundee natural in the first 5 days. The long string of 5-in. casing was being run this week and acid treatment was scheduled at the present total depth, 2,802 ft.

Lone discovery among six wildcat completions on current report was Sohio Petroleum Co. 1 State-Caldwell, C NW 20-23n-8w, Missaukee County wildcat which was completed in the Michigan Stray sand at a plug-back total depth of 1,159 ft. with 892,000 cu. ft. of gas showing on gage. It is not expected that this discovery will stimulate a very active drilling campaign in the district.

MICHIGAN SUCCESSFUL WILDCAT

Missaukee County, Caldwell Township: Sohio Petroleum Co. 1 State-Caldwell, C NW 30-23n-8w, 892,000 cu. ft. Stray gas, TD 1,166 ft., PBTD 1,159 ft.

MICHIGAN WILDCAT FAILURES

Arenac County, Moffatt Township: Don Rayburn D-1 State-Moffatt, NW NE SE 22-20n-3e, dry in Dundee, TD 3,118 ft.

Ottawa County, Jamestown Township: Hugh H. Heinig 1 Hollerman, E½ E½ NW 22-5n-13w, dry in Traverse, TD 1,827 ft.

Van Buren County, Almena Township: Wesley A. Moffatt & W. A. Cypher 1 Hall, SW SW NE 21-2s-13w, dry in Traverse, TD 1,255 ft.

Bangor Township: George F. Lister 1 No-

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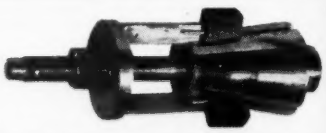
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

NEW HI-TEST STOUT-OWENS LINER-PULLER
THE ANSWER TO LINER-PULLER PROBLEMS



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Does Not Mar Inside of Liner.

Small . . . Very Compact.

Weighs 42 pounds . . . does the work of a 100 lb tool. The easy handling, efficient answer to your liner-puller problems.

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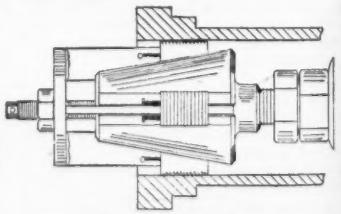

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STOUT-OWENS LINER PULLER CO
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vack Bros., SW SW NW 11-2s-16w, dry in Traverse, TD 1,072 ft.

Geneva Township: Del Fortney & Harris Oil Co. 1 Hildebrandt et al, SW SW SE 33-1s-16w, dry in Traverse, TD 1,034 ft.

PERMIAN BASIN

Scurry County Wildcat Test Flows 189 Bbl.

MIDLAND.—Lion Oil Co. drilled cement plus on its 2 Evelyn C. McLaughlin, prospective Canyon limestone discovery 10 miles southwest of Snyder in Scurry County, and after swabbing flowed 189 bbl. of oil in 12 hours. The flow was through chokes ranging in size up to ½ in., from casing perforations at 6,592-6,614 ft. Gas-oil ratio was 1,000 cu. ft. Operators continued flowing tests.

Six miles northeast of Snyder, and about 4 miles southeast of the new Dermott (Pennsylvanian) strike, Placid Oil Co. 1 Davis, Section 387, Block 97, H&TC Survey, was running casing before making further tests in the Pennsylvanian, and after testing the Ellenburger. The latter formation, topped at 7,720 ft., apparently carried only water and some gas. A 2-hour drill-stem test from 7,830-7,905 ft. recovered 270 ft. of gas-cut mud and 1,440 ft. of salty sulfur water. Electrical surveys were run before setting casing. The well has shown for possible production in the Canyon and Strawn sections at 7,020-7,175 ft. and 7,384-7,405 ft.

Sun Oil Co. 1 Helms, Section 636, Block 97, H&TC Survey, 20 miles northeast of Snyder, prepared to run a second test in the Ellenburger after recovering 35 ft. of gas-cut mud on a 90-minute test from 7,210-35 ft. Total depth was 7,237 ft. in dolomite.

A new wildcat for Scurry County was reported staked by Humble Oil & Refining Co. at its 1 Richard Bishop, 660 ft. from south and west lines of Section 164, Block 97, H&TC Survey. Location is 13 miles southwest of Snyder and about 3 miles south of Lion's 2 McLaughlin.

In Upton County, Magnolia Petroleum Co. was taking electrical surveys before setting casing for tests of the Ellenburger formation, which has yielded some free oil and gas from 12,530-805 ft. Last reported test was from 13,030-085 ft. The tool was open 1½ hours and recovery was 1,395 ft. of water blanket, 360 ft. of slightly gas-cut water blanket and 270 ft. of slightly gas and mud-cut water blanket.

In the Benedum field, Plymouth Oil Co. 1-47 A. E. Gordon, ½ mile north of the discovery, was the field's sixth producer in the Ellenburger and the eighth for the entire area. Flowing through ⅜-in. choke on tubing, from open hole between 11,440-475 ft., it made a daily potential of 433.5 bbl. of 59°-gravity oil, with no water. Gas-oil ratio was 3,772 cu. ft.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCAT

Pecos County: Jergins Oil Co. 1 Iowa Realty Trust Co., Sec. 125, Blk. 10, H&GN Sur., flowed 4,000,000 cu. ft. gas a day, 862-872 ft., TD 1,875 ft., PB 880 ft.

Tom Green County: Plymouth Oil Co. 1 J. Wiley Green, Sec. 193, Dist. 11, SPRR Sur., 15 mi. SE San Angelo, top Strawn 4,570 ft., top pay 4,724 ft., flowed 362 bbl. of 36°-gravity oil per day, natural, through ½-in. choke, GOR 600 cu. ft., elev. 2,124 ft., TD 4,754 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Howard County: Southern Minerals 1 Noble Read, Sec. 21, Blk. 30, T&P Sur., dry, TD 4,710 ft., San Andres 2,218 ft., elev. 2,340 ft.

Sterling County: L. G. Yarborough & Sons 1 R. W. Foster, Sec. 10, Blk. 13, SPRR Sur., 3½ mi. west and slightly south Marvin field, dry, TD 5,312 ft., San Andres 1,670 ft., no shows.

Lubbock County: Amerada Petroleum Corp. 1 Stribling, Sec. 9, Blk. D-7, ELRR Sur., 14 mi. NE Lubbock, dry, TD 10,679 ft., Clear Fork 4,645 ft., Tubbs 5,400 ft., Wichita Albany 6,155 ft., Pennsylvanian 7,735 ft., Mississippian 10,105 ft., Ellenburger 10,568 ft., Cambrian 10,650 ft., pre-Cambrian 10,672 ft., elev. 3,240 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Magnolia Petroleum Co. 1 Yates-Federal, prospective pumping discovery 3 miles southwest of the Crossroads field, in 31-9s-36e, reported a slight increase of oil, with less water, on its last gage. In 24 hours the well tanked 17 bbl. of oil and 7½ bbl. of water. Total depth was 4,922 ft., plugged back to 4,865 ft.

In the same area, Amerada Petroleum Corp. 1-C-A State, 9-10s-36e, was drilling ahead below 6,316 ft. Projected depth is 12,500 ft. Amerada's 1-B-T-A State, 2-12s-33e, was drilling below 4,245 ft. Amerada 1-C-N-A State, 33-15s-32e, was drilling at 4,465 ft. in lime. Two miles east of the Garrett shallow discovery, Amerada 1 J. R. Hamilton, 35-16s-38e, drilled ahead below 9,470 ft. A 4-hour drill-stem test at 9,433-69 ft. recovered 3,215 ft. of slightly gas-cut mud, having 5 ft. of free oil on top.

West of the Hobbs pool, Phillips Petroleum Co. 1 Shipp, 20-18s-37e, was drilling below 8,620 ft. in lime and chert. Stanolind Oil & Gas Co. 1-U State, 2-20s-38e, set 5½-in. casing to 6,900 ft. to test the Permian section. Total depth was 10,014 ft., in the pre-Cambrian, plugged back to 7,149 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Chaves County: Martin Yates, Jr., 1 Key, NE SW 27-15s-29e, dry, TD 1,776 ft., top sand 1,776 ft., with show of gas.

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ILLINOIS

North Richland County Continues Active

MATTOON.—East Dundas pool has another good completion this week to continue activity in the northern part of Richland County. The well, Bell Brothers 1 Abegglen, SW NE SW 26-5n-10e, was completed in the Rosiclare with an initial production of 150 bbl. per day from pay at 2,915-25 ft. Total depth is 2,935 ft. Drilling in this pool has been very active since August, which was about the time that increased interest developed in the Stringtown area to the east. In the area of these two pools, about 30 wells have been completed within the last 3 months, including several with initial productions above 500 bbl. per day.

In the Centralia area of Clinton County, Shell Oil Co. has completed 37-T E. C. Criley, NW NE NW 2-1n-1w, with an initial production of 118 bbl. daily from the Trenton at 3,950-4,040 ft. Total depth is 4,054 ft. The pool was not very active in the early months of the year, having only 2 Cypress completions in the first 6 months, but has had 10 new Trenton wells for the last half.

In the Geff area of Clay City-Noble Consolidated field, Tuley and Carter have completed 3 Sheets et al, NW NW SE 13-1s-7e, with an initial production of 165 bbl. per day from the Aux Vases at 3,088-3,116 ft.

ILLINOIS WILDCAT FAILURES

Clark County: Schafer and Granholm 1 Frank Hibber, SW SE NW 12-9n-11w, dry, TD 2,445 ft.

Fayette County: Paul Doran 1 J. M. Geble, NE SE SE 12-5n-2e, dry, TD 1,837 ft.

Franklin County: W. I. Lewis 1 U. S. Coal & Coke Co., NE SW SW 34-5s-3e, dry, TD 3,033 ft.

Wayne County: National Associated Petroleum Co. 1 Lena L. Bartz, SW SE SW 23-2n-5w, dry, TD 3,000 ft.

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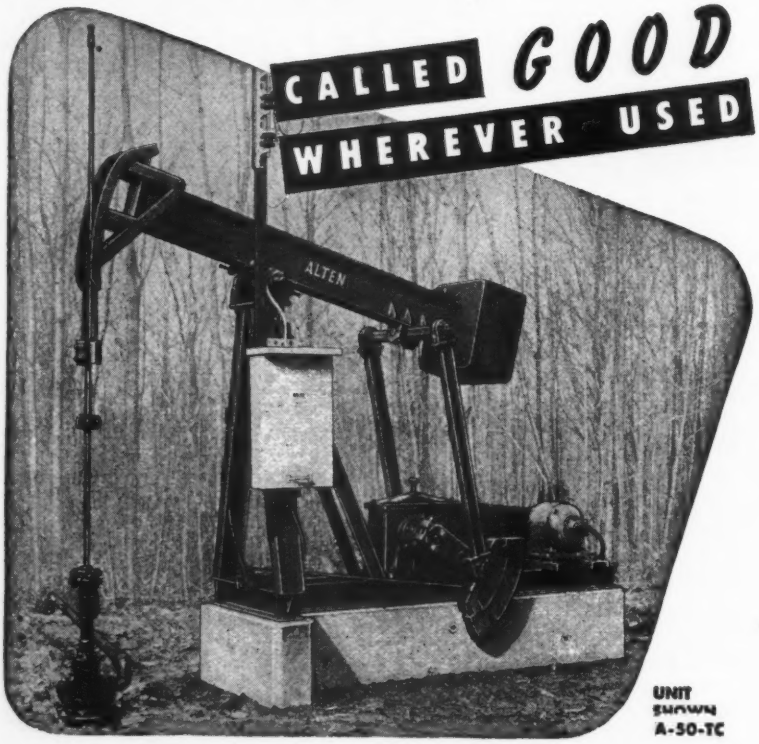

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TEXAS GULF COAST

Wharton County Gets Two Gas Discoveries

HOUSTON. — Two gas discoveries for Wharton County were completed this week. Hunt Oil Co. 1 Edwin Hawes, Jr., a dry gas discovery, in the Randall Jones and Maetin Allen surveys, approximately 1½ miles east of Wharton townsite, was completed through a 5/32-in. choke, flowing at the rate of 1,250,000 cu. ft. of gas daily with flowing pressure on tubing at 1,975 psi. Total depth is 6,517 ft. with 5½-in. casing cemented to 5,250 ft. Production is through perforations at 5,199-5,202 ft. The well is presently shut in.

Hassie Hunt, Trustee, 1 J. W. Prasifka, in S. A. Larche Survey, and Joseph Clements Survey, 2¼ miles southwest of Prasifka gas production, was completed flowing 10 bbl. of 55°-gravity condensate per day with 1,500,000 cu. ft. of gas daily. Gas-condensate ratio 140,000. Flowing pressure on tubing through a 5/32-in. choke was 2,100 psi. This is an old well drilled deeper, with old total depth at 6,512 ft. New depth is 7,515 ft., and perforations at 5,809-15 ft.

Ginther, Warren & Ginther 1 Sallie Flowers, wildcat in southeastern Goliad County, 11 miles south of Goliad townsite, is preparing to set production string of casing to a depth of approximately 4,300 ft., after electric log and side-wall samples had indicated showing above the 4,300-ft. level.

The 31 new locations reported for Districts 2 and 3 included 8 wildcat starts, 3 in Brazoria, and 1 each in Fort Bend, Galveston, Hardin, Matagorda and Wharton counties. Two successful wildcats were completed in Wharton County while 8 were dry, 2 in Harris, and 1 each in Brazoria, Chambers, Fayette, Goliad, Karnes and Orange counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Wharton County: New gas-condensate discovery—Hassie Hunt, Tr., 1 J. W. Prasifka, in S. A. Larche Sur. and Joseph Clements Sur., 2¼ mi. SE of Prasifka gas field (an old well drilled deeper), old TD 6,512 ft., new TD 7,515 ft., top sand 5,809 ft., perf. 5,809-15 ft., IP: 1,500,000 cu. ft. gas per day and 10 bbl. condensate per day through 5/32-in. choke, GOR 140,000, TP 2,100 psi., gravity 55°, no water.

New gas discovery—Hunt Oil Co. 1 Edwin Hawes, Jr., in Randall Jones & Martin Allen Sur., 1½ mi. E Wharton townsite, 6 mi. W Boling dome, TD 6,517 ft., top sand 5,199 ft., perf. 5,199-5,202 ft., IP: 1,250,000 cu. ft. gas per day through 5/32-in. choke, TP 1,975 psi., no water.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Brazoria County: F. A. Gillespie & Sons 1 Geo. H. Owen et al, Flag Pond wildcat, in Zeno Phillips Sur., dry, TD 10,928 ft.

Chambers County: Placid Oil Co. 1 Bertha N. Jackson, in R. E. Booth Sur., 8 mi. SE of Anahuac, dry, TD 9,236 ft.

Fayette County: D. C. Bintliff et al 1 F. R. Rodriquez, in Wm. Kuykendall ⅛ Lge., 7 mi. NW of Flatonia, dry, TD 2,041 ft.

Goliad County: M. H. Marr 1 Ben Marr et al, in Solomon Hall Sur., 2 mi. SE of Schroeder, dry, TD 4,509 ft.

Harris County: Caroline Hunt Tr. Est. 1 Martha O'Connor, in J. Dunman Labor, Humble area, dry, TD 5,014 ft.

L. M. Josey et al 1 Alice & Esther Jensen, in R. N. Davis Sur., Tr. 78, 5 mi. S of Satsuma, dry, TD 8,520 ft.

Karnes County: Earl Callaway Drilling Co. 1 Maggie E. DeBord Est., in Ramon

Musquiz Grant, 8 mi. NE of Kenedy, dry, TD 6,515 ft.

Orange County: Placid Oil Co. 1 Mary Peveto, Claiborne West Lge., approx. 1 mi. N of Orange production, dry, TD 8,459 ft.

OHIO, KENTUCKY

Small Extension for Homerville Gas Field

COLUMBUS.—The Homerville gas pool was extended a location to the east by a better than usual well completed by the Ohio Fuel Gas Co. on Jos. C. Shank, Section 17, Homer Township, Medina County. Clinton sand was found at 2,765-79 ft. and gaged 2,630,000 cu. ft. natural. The company will move another location to the east for the next test.

The East Ohio found only a small amount of gas in its semiwildcat in the northern part of Northampton Township, Summit County. The 1 Phillis Wheatley Association, Lot 71, showed 149,000 cu. ft. in the upper Red Clinton.

A second gas well was completed in the west part of Springfield Township, Muskingum County, smaller than the original well, but having virgin pressure. The completion, Ohio Fuel 1 Hampp-Bagent, Section 8, topped the Clinton at 3,577 ft. and was drilled in to 3,622 ft. with an open flow of 351,000 cu. ft.

Roy Proffitt has opened a shallow Cow Run pool in Section 36, Letart Township, Meigs County, with both oil and gas production. To date, 5 small oil wells and 2 gas wells, the last gaging 1,600,000 cu. ft., have been completed. The sand comes in between 700 and 800 ft.

New locations were down to 13 for the week. Washington County had 4, Ashland 2 and seven others 1 each. Lancaster and Stewart fields led in completions with 5 each out of 24.

OHIO SUCCESSFUL WILDCATS

Perry County, Hopewell Township: Foraker Drilling Co. 1 F. C. Henderson, Sec. 18, Clinton 2,786-2,808 ft., 86 bbl., TD 2,831 ft.

WESTERN KENTUCKY

OWENSBORO.—The wildcat east of Uniontown field in Union County, A. D. Falletti and B. Turner 1 George Randolph, 17-P-20, about 1 mile east of the pool, has been completed in the Cypress at 2,325-36 ft. with an initial production of 68 bbl. per day on pump.

In the extreme eastern part of Daviess County, Great Lakes Carbon Corp. has completed a McClosky well on the eastern edge of Pellville pool. The well, 2-M Head heirs, 25-P-33, made 86 bbl. per day on pump from pay at 1,000-05 ft.

Just east of the town of Stanley, F. M. Ashby has completed 1 St. Peter Catholic Church Land, 5-P-28, for 152 bbl. per day from the Palestine at 973-97 ft.

The Webster County deep test, Pure Oil Co., Ashland Oil & Refining Co., and I. B. Browning 1 M. L. Walker, 22-N-24, is drilling below 5,025 ft. The well had gas and a show of oil in a drill-stem test of the Kimswick lime at 4,810-40 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Union County: A. D. Falletti and B. Turner 1 George Randolph, 17-P-20, IP 68 bbl., Cypress 2,325-36 ft., TD 2,648 ft.

EASTERN KENTUCKY

ASHLAND.—In Johnson County, 19-R-79, Ashland Oil & Refining Co. is drilling below 1,500 ft. on 8 Wallace Williams, a rank wildcat test on Laurel Creek dome. This will be the first well in Johnson County to test the St. Peters and Knox dolomite formations.

On Caney Anticline, and in the town of Cannel City, 12-P-65, Sam Allen et al is shut down for orders at 4,447 ft. or 186 ft. in the Knox dolomite, with nearly 3,000 ft. of water in the hole. Previously Knox had been topped at 4,261 ft.

In Lee County, Jack Kindred is drilling at 2,930 ft. on 1 C. J. Sipple, a wildcat test to the deeper formations.

EASTERN KENTUCKY WILDCAT FAILURE

Lincoln County: Stanford Creamery Co. 1 fee, 2-M-58, dry, TD 1,782 ft., Knox 1,52 ft., water.

INDIANA

EVANSVILLE.—Carter Oil Co. has completed 2 good wells on the east side of Mt. Carmel pool in the southwestern tip of Knox County. Carter 2 State-White, SW SE SW 13-1s-12w, was completed in the Benoist at 2,099-2,105 ft. for 492 bbl. per day. Carter 1 E. Steckler, NE NE SW 13-1s-12w, made 105 bbl. per day on pump from the Benoist at 2,077-89 ft.

In October, George & Wrather Drilling Co. completed a good extension north of Martin pool in Vanderburgh County. One of the better wells of the week was in this area. George & Wrather and Aurora Gasoline Co. 7 William Reiman, NE SW SW 30-4s-11w, was completed in the Cypress at 2,201-10 ft. with an initial production of 125 bbl. per day on pump.

In Davies County, Coy Oil Co. 1 Cecil V. Wildman, SE SW SE 21-2n-7w, was bailing mud on last report, preparing to perforate casing for tests of the Rosiclare and Devonian. The well had saturation in the Rosiclare and while the Devonian was neither

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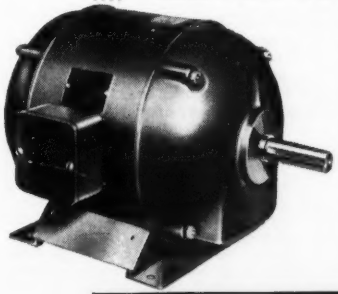

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cored nor drill-stem tested, the zone did show for oil pay on electric log.

INDIANA WILDCAT FAILURE

Sullivan County: George & Wrather 1 R. E. Jennings, SW SW NW 17-9n-9w, dry, TD 2,245 ft.

CANADIAN FIELDS

Hanna Discovery Well Put on Production

CALGARY.—The Hanna Petroleums No. 3 discovery well, about 90 miles northeast of Calgary, has started on production with an initial flow of 360 bbl. of oil daily. It flowed 32°-gravity clean crude oil through a ½-in. choke at a rate of 15 bbl. hourly. Gas volume at the well is believed to be small.

The Hanna No. 3, LSD 14, 5-31-14w4, producing from the Sunburst sand at base of the Lower Cretaceous, drilled to 3,755 ft., set 7-in. casing at 3,736 ft., then opened up 13 ft. of the pay zone by gun-perforating with 53 shots from 3,700-13 ft. The well is situated just southwest of the town of Hanna, and about 8 miles southeast of the Hanna-Dowling No. 1 wet gas discovery well.

Meanwhile, about 16 miles northwest of the Hanna oil discovery, Socony-Vacuum Craigmyle No. 1, LSD 12, 32-32-16w4, oil discovery in the Madison limestone at around 4,050 ft., is continuing to probe for possibilities in the Devonian horizon. The Craigmyle venture had a flow of gassy crude oil (about 34° gravity) to the surface in 19 minutes on a drill-stem test in the Madison formation, and is currently drilling and coring at 5,155 ft.

Redwater.—Imperial Oil's Redwater No. 5, LSD 9, 25-57-22w4, over 2 miles west of the Imperial discovery well, has contacted the D3 zone of the Devonian after penetrating the green shale which overlies this productive zone. How thick the producing zone at the No. 5 will be has not yet been established. However, it is believed that the D3 has been found just slightly above the water line at Redwater. Production string of casing will likely be run. Total depth is currently at 3,317 ft.

Imperial-Redwater No. 4, LSD 4, 31-57-21w4, has started on steady production with an initial potential of 1,070 bbl. daily. The well penetrated 80 ft. of oil-bearing D3 zone above the water line, cased through the zone, and gun-perforated the 61-ft. interval from 3,253-3,314 ft. for production.

Aldersyde.—Pan-Ranchmen's No. 1, LSD 4, 17-20-28w4, located near Aldersyde, about 25 miles southeast of Calgary, has been chalked up as a failure. The Ranchmen's wildcat, which had encountered Madison porosity at 7,348 ft., halted drilling at 7,350 ft. and ran drill-stem test, recovering 500 ft. of salt water plus a gas blow estimated at 100,000 cu. ft. daily. The Madison limestone had been topped att 7,279 ft., and tests had been run at 10-ft. intervals, with no gas, oil or water being recovered until the last test was run. Just above the Madison, in the Fernie section, a drill-stem test gave a 125,000-cu. ft. gas flow, while a test with bottom few inches in the lime gave a 40,000-cu. ft. gas flow plus a little free oil. The well is being abandoned at total depth of 7,350 ft.

Oliver Lake.—Leduc Calmar Oils, Ltd., Calgary independent, and Imperial Oil, Ltd., Canada's top exploring and producing company, have joined forces to explore a seismograph-indicated feature on the central Alberta plains. The initial well, in the Oliver Lake area, about 25 miles southeast of Edmonton, 25 miles due east of the Leduc oil field, and 38 miles south of the Redwater field, will probably be drilled in LSD 10, 15-50-21w4. Drilling is planned to get under way before the end of February.

Leduc.—The British-American Oil Co. and Leduc Leaseholds, Ltd., joint well about a mile southwest of Leduc production, has reached D3 zone, found water, and is being plugged back to take production from the D2. The D2 zone, contacted at 5,130 ft., had previously shown favorably on drill-stem tests. The well is currently being plugged back prior to running production string of casing and gun-perforating for production.

Home Oil Co. has staked and started rigging at Home Oil-Leduc No. 18, LSD 1, 3-50-26w4, a site in the same legal subdivision as the Home No. 17, a D3 pro-

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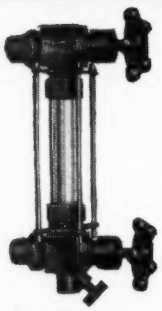

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ducer. No. 18 will go for D2 production. Meanwhile, Home No. 17, completed at 5,398 ft., is running initial potential test prior to being placed on steady production.

Initial open flow potential has been established at two more of Imperial's Leduc field wells. Imperial-Leduc No. 122, LSD 12, 26-50-26w4, D3 zone completion at 5,304 ft., rates open flow potential of 1,896 bbl. daily. Imperial No. 132, LSD 8, 27-50-26w4, D3 zone completion at 5,309 ft., has established an initial open flow potential of 1,251 bbl. daily.

ROCKY MOUNTAIN

California Co. Continues Testing Utah Wildcat

DENVER.—Mechanical difficulties have been encountered at The California Co.'s wildcat in the Upper Valley area, in South Central Utah. The well is now reported making 460 bbl. of fluid, 10 to 15 per cent oil, from a limestone in the Pennsylvanian between 8,777-91 ft. The well is the 1 Unit, C SW NW 12-36s-1e, Garfield County. On test a month ago it swabbed at the rate of 175 bbl. of 17°-gravity oil per day, with no water, from the same zone. Subsequently the well was deepened to 8,857 ft. and reportedly made only water. Casing was cemented on top of the producing zone and the well is now plugged back to 8,791 ft. The operator perforated the zone with five shaped charges per foot between 8,777-91 ft., prior to making the 460-bbl. test on pump. The operator has not reported whether the water is believed to be coming from the producing zone or due to faulty cement job, but testing is continuing prior to completion of the well. This wildcat is of great regional importance in an area where there have been no previous deep tests. Shows of gas, probably noncommercial, have been logged in the well up the hole. As a result of the discovery of oil in this zone, prior to deepening the well, several large blocks were acquired in the area. The California Co. has spudded and is drilling below 1,700 ft. at the Johns Valley wildcat, 15 miles northwest of the Upper Valley wildcat. This well is also scheduled to test Pennsylvanian beds.

Stanolind Oil & Gas Co. 11 Unit is now coring below 10,611 ft. in the Tensleep at the first deep test in the Beaver Creek field, Fremont County, Wyoming. The well is located in C N½ SE¼ 10-33n-96w, and top of Tensleep was logged at 10,442 ft. On drill-stem test in the top of the sand, the well filled at the rate of 8 bbl. of 42°-gravity oil per hour. Cores below this zone showed hard, fine, saturated sand. The zone is much harder than expected and the operator may drill the well to the Madison, at around 11,100 ft., prior to completion. This is the first well below the Sundance in this field, where Stanolind made a Lakota sand gas discovery in 1938 and now has nine completed wells in that formation.

At Little Sand Draw, Hot Springs County, Wyoming, Seaboard Oil Co. and Husky Refining Co. are now coring below 6,099 ft. at the 1 Government, NW NE SW 2-44n-96w, an apparent discovery in the Tensleep formation. The well topped the Tensleep at 6,056 ft. and on drill-stem test in the top of the formation, the well made 1,170 ft. of clean oil in 1 hour. The operator has cemented casing on top of the Tensleep and will complete the well in that formation. Oil was also recovered on tests of the Phosphoria in this well, but a drilling development program to that formation will be undertaken later. This well is on a small structure between the Golden Eagle and Gebo fields. At the present time Phillips Petroleum Co. is drilling a deep test at Golden Eagle, with this well now below 7,900 ft. in the Red Beds. The Tensleep is expected at around 9,700 ft.

Water was found in the Devonian at the Hunt Oil Co. Gulf Oil Corp.'s wildcat, the 1 Loberg, C SW SE 26-30n-36e, Valley County, Montana. This well is now drilling below 5,400 ft. with top of Devonian reported at 5,073 ft. On drill-stem test between 5,153-67 ft., the operator recovered 2,200 ft. of water. This wildcat is located on a block southeast of the Bowdoin Dome unit, and is a farmout from Gulf to Hunt.

Results have been disappointing in Stanolind Oil & Gas Co.'s first deep test in the Jackson Hole area of western Wyoming. The well is the 1 Unit, NE SE SW 25-44n-113w, in the Spread Creek area, where Stanolind and Sinclair Wyoming Oil Co. have extensive lease blocks. The well is now reported below 6,847 ft. probably in the Chugwater formation. Top of the Sundance was logged at 5,806 ft. and now shows of importance have been listed for the well. The well is located on a large surface structure and will test the Tensleep and possibly Madison.

In northern New Mexico, Stanolind has spudded a deep wildcat on the Rosa Unit at the 1 Unit, C SW SE 11-31n-6w, Rio Arriba County. The well is located on a seismic high northeast of the Kutz Canyon area, where a Dakota well was completed a year ago. Several new locations are planned in the shoreline play on the east side of the Powder River Basin in Wyoming, including one by W. E. Atkinson in the Morrisey area at the 1 Government, SW SW SW 15-41n-63w, where Delta Drilling Co. is rigging up rotary for a 5,000-ft. Dakota-Lakota sand test.

WYOMING WILDCAT FAILURES

Fremont County, Sweetwater area: Carter Oil Co. 1 Yellowstone, C NW NE 20-

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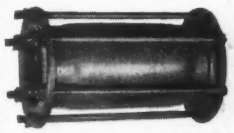

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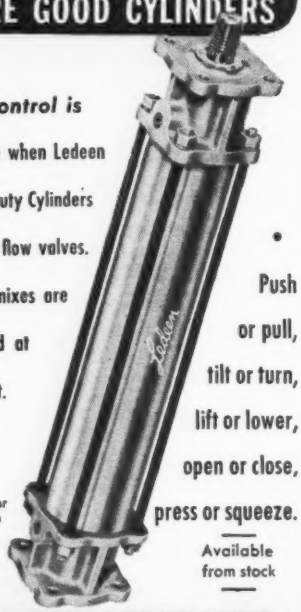

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Lincoln County, Waterfall area: Union & Carter 1 Government, SW SE SW 35-11n-115w, TD 5,645 ft., dry, Phosphoria 4,813 ft., Weber 5,242 ft.

NORTHERN NEW MEXICO WILDCAT FAILURE

McKinley County, Mariano Lakes: Tide Water Associated Oil Co. 1 Mariano, C SE SE 8-15n-13w (NMPM), TD 4,695 ft., dry, Morrison 45 ft., Entrada 980 ft., Chinle 1,242 ft., Shinarump 2,449 ft., Permian 2,537 ft., Pennsylvanian 4,608 ft., granite 4,695 ft.

CALIFORNIA

Newhall Area Discovery Placed on Production

LOS ANGELES.—R. W. Sherman's discovery in the Newhall area of Los Angeles County, the 2-1 Newhall Community, 2-3n-16w, has been placed back on production successfully with initial production reported to be 960 bbl. daily through an 18/64-in. choke. Gravity of the oil is 40.2° with no water cut reported. Casing pressure is 1,280 psi. Currently the well is choked back to a production of approximately 400 bbl. daily with a 14/64-in. choke.

Sherman originally completed this discovery well several weeks ago, but the oil flow went to water and the well was shut in for remedial measures. Considerable difficulty was experienced in locating and shutting off the water, but operators are confident that similar troubles can be eliminated in future wells.

Barnsdall Oil Co. has brought in another good well in the Guijarral Hills field of Fresno County. The company's 31-2-1 Dessel, 2-21s-16e, came in last week flowing at the rate of 961 bbl. daily of 38.1°-gracity oil through a 16/64-in. choke. Water cut was 0.4 per cent. This new well is producing from the Leda sand at the interval 8,870-8,915 ft. and is the fourth well to be completed successfully in the field. One location south of the discovery well, it is the second producer for Barnsdall in the field. Standard Oil Co. of California and Robert S. Lytle have completed one producer each, both wells being within ¼ mile of Barnsdall's discovery well. Next completion in the field probably will be Barnsdall 84-34-1 Allison, 34-20s-16e, which currently is coring ahead at 8,750 ft. In addition to the Allison well, two other ventures are under way in the new field. Barnsdall is rigging up at its 1-2-3 Dessel, 2-21s-16e, and Standard is drilling ahead below 7,063 ft. at its 35-5F Fee, 35-20s-16e.

Shell Oil Co., Inc., has announced officially the completion of its new gas field discovery, the 3-1 Pleasant Creek Unit, 8-8n-1w. Located approximately 2½ miles northwest of the town of Winters, in Yolo County, the discovery is about 5 miles west of the Winters gas field which Shell opened in 1946. Initial gage of the new well was reported to be 10,000,000 cu. ft. of gas daily through a 1-in. choke from the interval 2,783-2,818 ft.

CALIFORNIA SUCCESSFUL WILDCAT

Yolo County, Pleasant Creek area: Shell Oil Co., Inc. 3-1 Unit, 8-8n-1w, flowed 10,000,000 cu. ft. gas daily through 1-in. choke, perf. 2,783-2,818 ft., elev. 240 ft., TD 3,000 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, McKittrick area: Bankline Oil Co. 4 McKittrick, 12-30s-21e, dry, elev. 1,075 ft., TD 1,014 ft.

Oildale area: W. L. Geisler 1 Surgener, 7-29s-28e, dry, elev. 442 ft., TD 2,925 ft.

Paloma area: Richfield Oil Corp. 67-24 Lakeside, 24-31s-25e, dry, elev. 308 ft., TD 11,385 ft.

Tejon area: C. C. M. O. Co. 100-32 Fee, 32-11n-19w, dry in gray sand, elev. 1,085 ft., Santa Margarita 2,588 ft., Pulv shale 4,595 ft., TD 5,004 ft.

Jergins Oil Co. 55 Tejon, 9-11n-18w, dry in granite, elev. 874 ft., Santa Margarita 735 ft., granite 1,730 ft., hard granite 1,760 ft., TD 1,780 ft.

Monterey County, San Ardo area: Barnsdall Oil Co. 1 Echenique, 35-21s-9e, dry in schist, elev. 530 ft., TD 948 ft.

San Benito County, Ciervo area: Coalinga Welding & Drilling Co. 1-27 Ashurst, 9-17s-11e, dry in gray shale, elev. 1,773 ft., TD 5,020 ft.

San Luis Obispo County, Cayama Valley area: Richfield Oil Corp. 1 Rickard-King, 26-12n-30w, dry, elev. 1,473 ft., TD 3,133 ft.

Panorama Hills area: Western Gulf Oil Co. 1 BAC-US, 9-31s-21e, dry, elev. 2,900 ft., TD 4,814 ft.

Santa Barbara County, Los Alamos area: Amerada Petroleum Corp. 1 Tognazzini, 14-8n-33w, dry, elev. 750 ft., TD 8,618 ft.

Summerland area: Loon Point Oil Co. 1 Bailard, 23-4n-26w, dry, elev. 60 ft., TD 2,602 ft.

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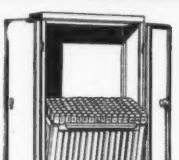

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LA.-ARK.

Three Wildcat Locations Announced This Week

SHREVEPORT.—Drilling reports were not in, covering the various fields of North Louisiana and South Arkansas, due to the holidays. However, several new wells were reported for the week. Barnsdall Oil Co. was preparing to spud in its 1 Ardis, 27-22n-1w, near Sarepta in Boosier Parish. Contract depth of 9,200 ft. makes it the first deep test for the area.

Lyons & Prentiss have made location for a wildcat some 5 miles east of the Hico-Knowles area, to explore the various sands of the Cotton Valley section. The well is to be the 1 Mrs. Della Colvin, SW NW SE 18-19n-2w, in Lincoln Parish.

Continental Oil Co. 1 Mansfield Lumber Co. in 34-13n-4w, Winn Parish, is to be a 12,500-ft. wildcat.

Seven miles north of Stephens, Ark., Petersen Drilling Co. was said to have prospects of new production in the Nacatoch sand, topped around 1,287 ft. Operators set casing to that depth and prepared to test. Location is 6 miles northeast of the Smart field, and about 4 miles east of low-gravity production.

N. CENTRAL TEXAS

Young County Gets Caddo Discovery

WICHITA FALLS.—Two miles northwest of Olney in Young County, Hunter Brothers of Wichita Falls prepared to complete their 1 Weichman as a Caddo discovery. Plug was drilled to 4,366 ft., 3 ft. off bottom, and casing perforated with 40 shots from 4,345-55 ft. After a 250-gal. acid treatment the well kicked off to flow, but was shut in without being gaged. Location is Block 173, TE&L Survey.

Location was announced this week for a western outpost test to the Holbert Caddo field of Young County. The proposed test will be Warren Oil Corp. 1 Frank Daws, 467 ft. from east and 1,400 ft. from south lines of Block 733, TE&L Survey, and approximately on the center of Throckmorton County's east line. Contract depth is 5,000 ft.

M. A. Grisham 2 Halbert, Block 1,193, TE&L Survey, east outpost to the Morrison (Strawn) field of southwestern Throckmorton County, and a Mississippi test, had prospects of extending Strawn sand production. On a drill-stem test from 3,920-35 ft., gas came to the surface in 6 minutes and oil in 1 hour and 30 minutes. Recovery from the pipe was not reported and operators drilled ahead below 4,285 ft., in the Caddo.

Five miles south of Dundee in Archer County, The Texas Co. 1 Wilson, Block 2, S. P. Ellis Survey, was drilling deeper after recovering 100 ft. of slightly oil-cut mud and a small amount of free oil, on a 1-hour test of the Caddo at 4,740-62 ft.

A 5,000-ft. wildcat test 1 mile south of the Woodbine field in Cooke County was announced by A. R. Dillard, Wichita Falls, which will be the 1 Addie Ware, in the northwest corner of the east 25 acres of the B. F. Baker Survey. In northern Clay County, G. P. Langford, Jr., staked location for 1 Henderson, 330 ft. east and 6,930 ft. from south lines of the R. R. Brown Survey, 6 miles northeast of Byers. Scheduled depth is 2,600 ft. In Wise County, 2 miles south of Paradise, Mid-Continent Petroleum Corp. spudded and set 346 ft. of 10-in. surface casing at its 1 McBride, W. Burke Survey.

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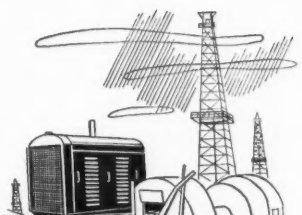

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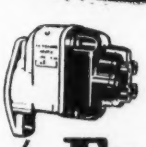

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Oil Divorcement Survey Asked by House Group

WASHINGTON.—The House small business committee wound up its work for the Eightieth Congress last week with a recommendation looking toward divorcement of the several branches of the petroleum industry.

The recommendation was one of more than a dozen suggestions by Rep. Walter C. Ploeser of Missouri, retiring Republican chairman of the committee, offered to "revitalize" the Federal Trade Commission and stiffen enforcement of the antitrust laws.

The committee did not come out flatly for divorcement of integrated industries such as oil, steel, and rubber but suggested, instead, that the FTC make investigations and report to Congress on the desirability and feasibility of eliminating vertical integration in manufacturing and distribution.

Other suggestions for the FTC called for an investigation of the desirability and feasibility of breaking down "conglomerates" in business — companies producing several lines of products not closely related; a study of interlocking directorships to determine what types should be prohibited and whether the number of posts an individual holds should be limited; and a study of revision of the Robinson-Patman Act to define "selling at unreasonably low prices" as including sales below cost, similar to the Michigan law applying to petroleum and bakery products.

The report referred to the testimony of Rankin Peck, president of the National Congress of Petroleum Retailers, who urged exploration of the possibilities of formulating legislation preventing sales below cost which, he said, comprised a type of competition against which small business is defenseless.

The committee recommended "adequate penalties" for antitrust violations, suggesting that in certain cases such as conspiracy to control prices or supply, selling below cost to eliminate competitors, full-line forcing and tying contracts, or exclusive leases, sales, or contracts, persons found guilty should be enjoined from serving as officers or directors of any corporation for a "minimum period of years." It also suggested that parties injured by such operations should be permitted to sue for three times the amount of their injury.

Other recommendations called for adequate appropriations for the Department of Justice and Federal Trade Commission, the establishment of bipartisan courts to handle antitrust cases, and control of mergers through the acquisition of assets of competing firms. The committee also would outlaw consent decrees and nolo contendere pleas in certain types of antitrust cases.

While the report would give the Federal Trade Commission authority for which it has been working for a number of years, Department of Justice officials were represented as highly critical of the committee's suggestions for the handling of antitrust suits, expressing satisfaction with the present penalties and procedures.

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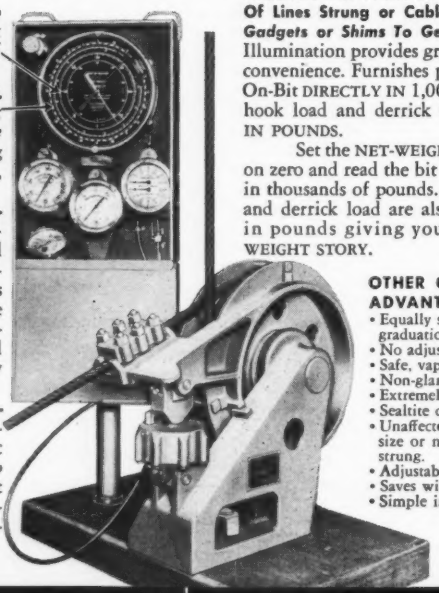

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Tide Water Gives Up Plan To Buy Doheny Interests

Tide Water Associated Oil Co. and Mrs. Carrie Estelle Doheny of Los Angeles have been unable to arrive at satisfactory arrangements for reinstating the purchase contract between them for the acquisition by the company of Mrs. Doheny's interest in Coalinga Nose oil and gas field in California.

Since Mrs. Doheny had made the condition that the transaction be completed before the end of 1948, it has been decided by the parties that negotiations should be terminated. The company had tried and failed four times to get a stockholders' favorable vote on the purchase which would have involved an expenditure of $43,000,000.

ERP Oil Consumption Shows Gain in 1948

WASHINGTON. — Oil consumption in the countries participating in the European Recovery Program will be about 47,000,000 tons (about 900,000 bbl. per day) for 1948, compared with 38,000,000 tons in 1947 and 29,000,000 in 1938, it is estimated by the Organization for European Economic Cooperation. Consumption of finished products in Europe, excluding overseas territories, will be nearly 50,000,000 tons in 1950.

The present world oil situation was discussed in Paris and London last month by Walter J. Levy, chief of the petroleum branch of the Economic Cooperation Administration, who told the French Association of Petroleum Technicians that by expanding refining operations, France has relieved the overstrained refining capacity outside Europe.

"We are most impressed by the tremendous effort made by your government, your industry, and your people in reconstruction of the oil industry that suffered so greatly during the last war," Levy said.

Production in the United States increased by about 10 per cent in 1948, while other world producing areas, not including Russia and its satellites, lifted their output by 20 per cent, Levy pointed out.

"The actual increase of production in 1948 in the democratic countries," he declared, "is twice as much as the total 1948 output of the Soviet Union and all its satellite countries."

Levy said that France has made a more rapid progress in refining than any other country in Europe, reaching a rate of 11,000,000 tons by the end of last year at an expenditure of not more than 150,000 tons of steel, mostly produced and manufactured within the country.

Report Shows Domestic Oil Output Reaches New Peak

WASHINGTON.—Domestic oil production topped the 2-billion-barrel mark last year for the first time in the history of the industry, it is estimated by the Bureau of Mines.

In a year-end statement on the progress of the extractive industries, the bureau estimated 1948 crude-oil production at 2,012,000,000 bbl. valued at $5,210,000,000, compared with 1,856,107,000 bbl. worth $3,548,266,000 in 1947.

Production of natural gasoline was placed at 3,910,000,000 gal. valued at $322,500,000, against 3,654,520,000 gal. valued at $218,800,000 last year, and other liquefied petroleum gases were

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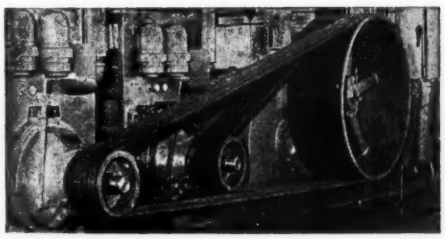

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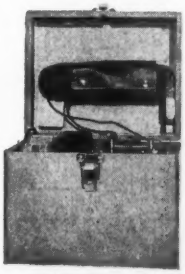

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placed at 2,110,000,000 gal. valued at $111,700,000 against 1,889,524,000 gal. valued at $68,200,000.

The bureau estimated the 1948 output of natural gas at 4,870,000,000 M.c.f. valued at $1,170,000,000, against 4,444,693,000 M.c.f. worth $1,032,200,000 last year, and helium production, for the fiscal year ended June 30, last, at 67,486,567 cu. ft. valued at $641,848 against 63,198,650 cu. ft. valued at $541,307.

Purchase of Hughes Tool Has Been Called Off

Negotiations on a proposed contract for the purchase of Hughes Tool Co. by Dillon, Read & Co., which have been under way for 5 months have been "cancelled and called off," it was revealed in a letter to the oilfield equipment company's employes from Howard Hughes, president.

Dillon, Read & Co. proposed the formation of a new corporation owned 45 per cent by Dillon, Read & Co., 10 per cent by a picked group of Houston business men, and 45 per cent by the present executives of Hughes Tool. Hughes had made clear to the banking firm that he must have assurance that his "present organization and personnel would be left undisturbed."

Hughes gave "certain legal and technical obstacles" as the reason for the failure to reach an agreement.

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1948 is now in preparation and will soon be ready. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

Lake Creek Field Operators Commended in Bureau Study

An engineering report released by the U. S. Bureau of Mines commends the ingenuity displayed by operators who brought Lake Creek gas-condensate field in Montgomery County, Texas, into production in time to add to the nation's supply of liquid fuels during World War II.

Although unusually difficult to develop because it is on the borderline between an oil and a natural-gas field and because of the great depth and peculiar formation of its fuel-bearing zones, the field, discovered in February 1941, only 10 months before Pearl Harbor, produced natural gas richly laden with vaporized fluid from nine zones and some oil from the uppermost zone.

For economical operation, many of the wells were designed to draw gas, or gas and oil, simultaneously from two or three zones. To make these multiple-zone wells practicable and economical, the report notes, many new types of complicated equipment were invented and developed.

Mid-Continent Section of A.P.I. Plans Tulsa Meet

The American Petroleum Institute's division of production, Mid-Continent district, will hold its spring meeting at the Mayo Hotel in Tulsa, March 23-25. W. A. Alexander, Shell Oil Co., Inc., Tulsa, will be chairman of the general arrangements committee. J. H. Field, Sohio Petroleum Co., Oklahoma City, is chairman of the program committee.

Other committee chairmen are: registration, H. R. Bolton, Ohio Oil Co., Tulsa; publicity, H. M. Cooley, Bethlehem Steel Co., Tulsa; entertainment, C. F. Bedford, Stanolind Oil & Gas Co., Tulsa; and hotels, Eugene Hosford, Gulf Oil Corp., Tulsa.

THE OIL AND GAS JOURNAL

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Secrecy Deters Atomic-Energy Use For Industry, Group Reports

WASHINGTON.—Excessive secrecy, much of it apparently not dictated by national security, rather than the seeming lack of a hope-of-profit motive, is the great deterrent to broad industrial participation of the development of atomic energy, it was reported last week by the industrial advisory group of the U. S. Atomic Energy Commission.

The advisory group, which includes in its membership Bruce K. Brown, vice president of Standard Oil Co. (Ind.); Gustav Egloff, director of research of Universal Oil Products Co.; Paul D. Foote, executive vice president of Gulf Research & Development Co.; and Robert E. Wilson, chairman of Standard Oil Co. (Ind.), summarized the results of a year's study in recommendations designed to loosen up the commission's procedures to the point where industrialists may secure enough information about atomic energy to enable them to decide where and how they can cooperate in its development.

The petroleum industry, it was pointed out, is one of a number that will have the most interest in atomic energy. But, it was commented, if even the advisory group, which was given excellent cooperation, found burdensome security regulations a serious obstacle in making its survey, industry has little chance of intelligent participation.

The need for secrecy, which is not disputed, creates "a fundamental unsolved problem," but it is hoped the barriers will gradually be reduced although it was admitted the group could not suggest any simple formula to bring that about.

More Than Profit Involved

"We think that today the central difficulty in getting a broad industrial attack on the problems of atomic energy is the fact that industry has no way of determining whether important opportunities in fact exist in which to take part," the group reported. "In our view it is a mistake to think that the seeming absence of conventional incentives to business is the main cause of the present situation. While the hope-of-profit motive may be the primary inducement to industry in entering new ventures, much more than the prospect of immediate profit is involved here. The expectation of financial reward even in the distant future—the desire for prestige, and for getting an early start in an important new field—these are often enough. A genuine concern for the nation's defense would be sufficient inducement to some, regardless of the financial return.

"It has been stated that industrial opportunities in atomic energy are potentially unlimited. But they are at present so shadowy that business men neither know where to look nor what to look for. Today no one can say whether the prospect of profits or other incentives exist, because under present conditions the great majority in industry know little or nothing about the subject. . . . If industry is to help in atomic energy and benefit from it, industrialists must first be put in a position to find out enough about the subject to determine whether and where there are in fact opportunities to take part."

To this end, the group recommended that the Government provide industry with much useful information about atomic energy; greatly increase direct personal contacts between men in industry and the atomic-energy project; set up and make effective use of various kinds of industrial advisory committees; further strengthen the contract system; and perfect the commission's form of organization so that it will be in a better position to deal effectively with industry.

Basing-Point Clarification Necessary, Johnson Says

WASHINGTON.—Immediate introduction of legislation to clarify the confusing situation resulting from court decisions on basing-point pricing was promised this week by Sen. Edwin C. Johnson of Colorado, scheduled to be the new chairman of the Senate trade policies subcommittee over which Sen. Homer Capehart of Indiana presided last year.

Johnson said his bill has not yet been perfected, and full hearings will be held by the subcommittee before it is finally drafted.

The senator said that the current chaotic situation as to what pricing practices are legal is not in the best interests of the national economy and prompt and effective clarification must be undertaken by Congress.

He warned, however, that those who have been hoping for legislation "to weaken the vigorous and effective enforcement of the antitrust laws or make price-fixing conspiracies easier to achieve and more difficult to detect will be bitterly disappointed" by his bill which, he said, is designed to materially strengthen the antitrust laws and make more effective the power of the Federal Trade Commission to enforce the law against price-fixing conspiracies.

Liquefied Petroleum Gas Sales Rose 29.5 Per Cent

(Continued from page 43)

from the source of production. In a number of cases, these gases are composed largely of olefins—unsaturated hydrocarbons. It is estimated that 500,000,000 gal. will be used in 1948 for chemical manufacturing purposes. This represents an increase of 20.7 per cent over 1947.

During 1948 great results have been accomplished in increasing the storage capacity at consumers' installations. The industry has found this to be essential in order to provide gas for house heating during peak demands when requirements exceed production. Transportation facilities, both tank car and transports, have been increased in adequate number to handle the increased amount of L.P.G. marketed. The pipe-line movement of L.P.G. to the domestic, industrial, and utility markets is increasing and during the year a major marketer completed a finished-petroleum-products pipe line through which propane and butane are transported.

New sources of production of liquefield petroleum gas together with the enlargement of existing producing facilities have increased the supply of L.P.G. during the past year to keep pace with the increase in demand.

Most of the states in the United States have accepted the National Fire Protection Association liquefied petroleum gas code, which is generally referred to as the National Board of Fire Underwriters' Pamphlet No. 58 entitled "Standards for the Design, Installation and Construction of Containers and Pertinent Equipment for the Storage and Handling of Liquefied Petroleum Gases as recommended by the National Fire Protection Association." This indicates the general acceptance of this code as the basis for standards of safety. The code has been used in whole or in part as the basis of many state and local laws, rules, and regulations. Various provinces in Canada are considering it for adoption as provincial regulations. The National Fire Protection Association during 1948 developed a code for the use of L.P.G. by utilities.

While the unabated increased demands for L.P.G. require major readjustments in all phases of the industry, every indication points to the ability of this industry to meet the challenge of these demands.

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 1, 1949

	Total of all wells							Wildcat completions and discoveries									
						Cum.							Cum. total, 1-1-49				
	Comp.	Oil	Gas	Dry	Footage	1948-1-1-49	1947-1-3-48	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	24	12	0	*12	22,135	1,478	1,784	0	0	0	0	0	0	0	0	0	0
Pennsylvania	41	22	2	†17	70,151	2,534	3,188	0	0	0	0	0	0	0	9	14	23
West Virginia	16	4	11	1	45,975	828	862	0	0	0	0	0	3	0	37	43	83
Ohio	24	10	8	‡6	63,573	1,418	1,387	1	0	0	0	1	3	0	12	37	52
Indiana	8	7	0	1	16,243	1,122	662	0	0	0	1	1	28	0	1	107	136
Kentucky	15	2	6	7	42,457	810	765	1	0	0	1	2	11	0	0	44	55
Illinois	19	6	0	13	49,869	2,511	2,133	0	0	0	4	4	50	0	2	394	446
Michigan	14	6	1	7	27,662	893	919	0	0	1	5	6	21	0	11	276	308
Kansas	81	51	1	29	267,234	3,230	2,761	1	0	0	9	10	64	0	8	446	518
Neb., Mo., Iowa	0	0	0	0	0	9	7	0	0	0	0	0	0	0	0	7	7
Oklahoma	91	53	4	§34	383,194	4,271	4,058	0	2	1	14	17	130	12	30	639	811
Texas	233	129	8	96	976,418	12,223	9,293	1	1	2	37	41	331	39	104	2,082	2,556
North Central (Dist. 7-B & 9)	73	24	1	48	198,320	3,833	2,870	0	0	0	8	8	121	3	13	749	886
West (Dist. 7-C & 8)	64	55	2	7	290,953	3,255	2,294	1	0	1	3	5	70	1	7	240	318
Panhandle (Dist. 10)	9	9	0	0	28,124	664	499	0	0	0	0	0	1	0	3	11	15
Eastern (Dist. 5 & 6)	20	10	4	6	100,880	629	593	0	0	0	4	4	12	2	1	125	140
Gulf Coast (Dist. 2 & 3)	29	13	1	15	210,642	1,889	1,564	0	1	1	8	10	73	28	39	438	578
Southwest (Dist. 1 & 4)	38	18	0	20	147,499	1,953	1,473	0	0	0	14	14	54	5	41	519	619
Louisiana	35	27	0	8	102,770	2,322	1,672	0	0	0	1	1	51	28	9	221	309
Northern	30	24	0	6	61,420	1,550	1,009	0	0	0	0	0	4	6	2	107	119
Southern	5	3	0	2	41,350	772	663	0	0	0	1	1	47	22	7	114	190
Arkansas	0	0	0	0	0	309	336	0	0	0	0	0	6	0	0	94	100
Mississippi	14	5	2	7	95,424	429	488	0	0	0	4	4	4	2	3	106	115
Southeastern States	0	0	0	0	0	53	64	0	0	0	0	0	0	0	0	48	48
Montana	21	12	2	7	56,021	330	316	1	0	0	4	5	6	0	0	32	38
Wyoming	49	30	2	17	201,892	640	268	0	0	1	7	8	26	0	4	85	115
Colorado-Utah	17	6	3	8	78,525	242	215	0	0	1	8	9	3	0	7	60	70
New Mexico	12	6	2	4	39,819	607	559	0	0	0	2	2	6	1	3	61	71
California	60	45	1	14	251,287	2,886	2,070	0	0	1	11	12	120	1	6	357	484
Total United States	774	433	53	288	2,790,649	39,145	33,807	5	3	7	108	123	863	83	246	5,153	6,345
Total previous week	776	437	56	283	2,862,599	38,371	33,177	17	3	5	118	143	858	80	239	5,045	6,222
Total January 3, 1948	630	360	45	225	2,123,705			6	0	4	66	76	688	88	230	4,175	5,181

Service wells included: *12, †15, ‡2, §1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED DECEMBER 25

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	861	2,283	209	1,562	1,618	23,057	10,598	25,237	12,198
Appalachian:									
District 1	105	300	61	82	99	2,507	412	930	431
District 2	77	254	36	51	100	1,215	113	267	228
Ind., Ill., Ky.	928	3,395	438	988	1,124	20,779	4,335	11,589	5,561
Okla., Kans., Mo.	426	1,640	206	470	546	9,555	1,261	5,353	2,880
Inland Texas	263	1,152	101	207	435	3,689	670	882	1,197
Texas Gulf Coast	1,463	4,419	908	2,296	1,799	16,344	3,107	14,187	11,398
La. Gulf Coast	490	1,353	367	691	446	6,031	2,253	4,050	3,924
N. La. and Ark.	88	246	63	84	141	2,750	494	820	304
Rocky Mountain:									
New Mexico	14	52	7	16	27	83	25	53	32
Other Rocky Mtn.	156	505	39	185	262	2,366	238	1,590	1,071
California	913	2,576	107	1,144	2,524	11,910	800	14,313	46,957
Dec. 25, 1948	5,784	18,175	2,542	7,776	9,121	100,286	24,306	79,271	86,181
Dec. 18, 1948	5,695	17,902	2,537	7,539	9,053	98,225	25,342	81,071	87,217
Dec. 27, 1947	5,543	17,013	2,334	7,041	9,698	91,269	16,293	50,324	51,896

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 240,648,000 bbl. as of December 25—up 1,213,000 bbl. One year ago 222,777,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas‡	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.23
Bradford, Pennsylvania	4.50
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Jan. 1 crude oil	B. of M. Dec. demand	Dec. 25 crude oil
Alabama	1,150	1,700	1,200
Arkansas	82,600	88,000	81,750
California	957,100	960,000	956,200
Colorado	*63,305	50,000	§62,740
Eastern	61,250	65,500	63,000
Florida	1,325	1,100	850
Illinois	175,100	168,000	177,200
Indiana	24,000	20,000	23,000
Kansas	297,500	304,000	306,400
Kentucky	23,200	23,000	23,900
Louisiana	496,825	496,000	495,300
North Louisiana	116,950	.....	116,300
South Louisiana	379,875	.....	379,000
Michigan	47,700	45,000	45,100
Mississippi	124,900	131,000	123,000
Montana	25,800	26,000	25,790
Nebraska	300	700	350
New Mexico	134,440	132,000	134,490
Oklahoma	444,000	432,000	448,300
Texas	2,489,650	2,450,000	2,515,675
Dist. 1 (Southwest)	27,800	.....	27,935
Dist. 2 (Southwest)	176,700	.....	179,150
Dist. 4 (Southwest)	246,675	.....	250,200
Dist. 3 (Gulf Coast)	495,900	.....	503,090
Dist. 5 (Eastern)	50,925	.....	51,725
Dist. 6 (Eastern)	123,525	.....	124,875
East Texas field	289,000	.....	289,000
Dist. 7-C (West)	50,125	.....	50,425
Dist. 8 (West)	733,750	.....	743,225
Dist. 7-B (W. Central)	62,375	.....	62,350
Dist. 9 (N. Central)	143,750	.....	144,600
Dist. 10 (Panhandle)	89,125	.....	89,100
Wyoming	158,130	146,000	155,530
Total United States	†5,608,275	5,540,000	§5,639,775

Change from prev. wk., dn. 31,500

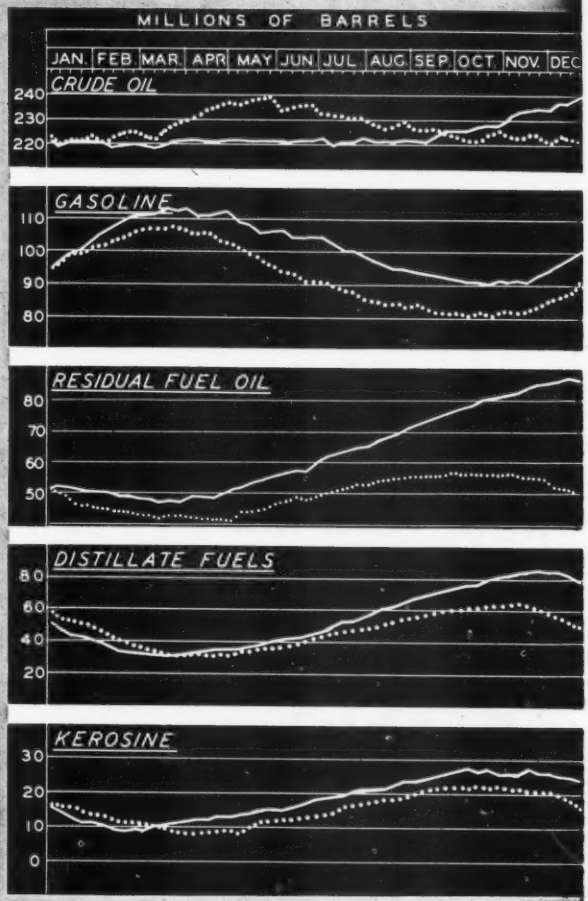
Total production Jan. 1, 1948-Jan. 1, 1949 ‡§2,029,878,980 bbl.

Same period last year (crude plus cond.) 1,830,785,775 bbl.

*Incl. 160 bbl. Utah production. †Not incl. 82,925 bbl. condensate. ‡Incl. 27,510,715 bbl. condensate. §Revised.

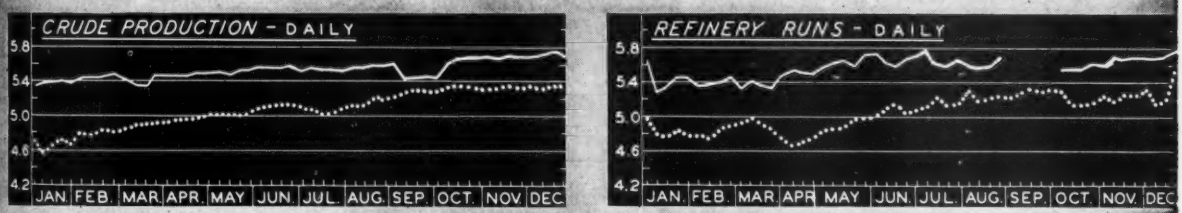
STOCKS IN UNITED STATES

---- 1947 ——— 1948



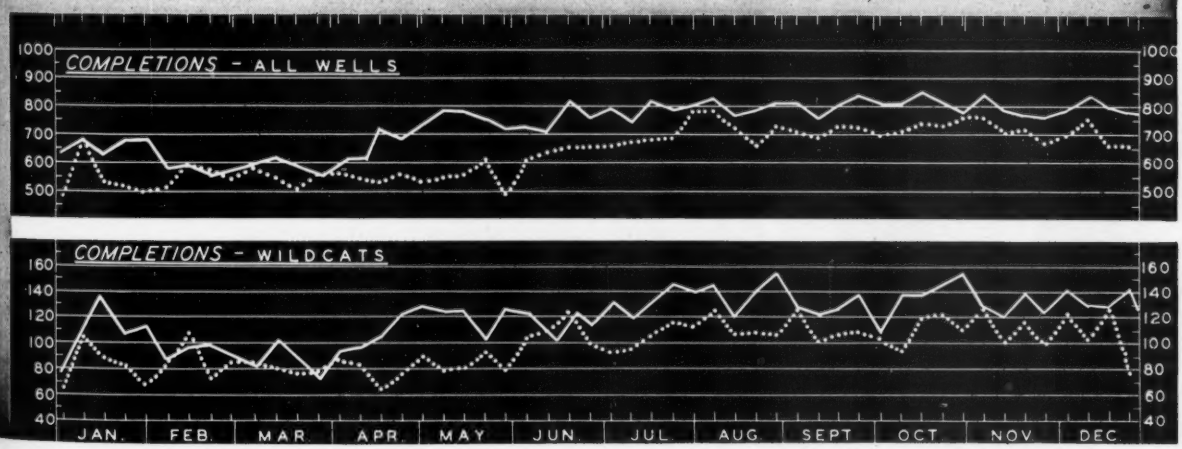
DAILY OPERATIONS

---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948



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MARKETS

INCREASED production of crude oil and capacity runs at refineries throughout the year have more than met the growing demand for crude and products for the present time at least. With the turn of the year high stock levels continued, as storage at refineries and distribution points remained at all-time high levels. At the close of the year stocks of the four major products amounted to approximately 80,000,000 bbl. above those at the same period a year ago. Residual and distillate stocks accounted for more than 75 per cent of the gain. Kerosine and gasoline stocks showed gains of 8,000,000 and 9,000,000 bbl., respectively.

Some weakening continued to show itself both for crude oil and products in certain areas throughout the country last week. Reductions from 6 to 24 cents per barrel for Pennsylvania Grade crude oil produced in four districts south of the general Bradford area were announced. Socony-Vacuum followed Esso Standard in a 25-cent per barrel reduction of heavy fuel oils at Atlantic Seaboard terminals. Further reductions in price quotations for gasoline and certain burning oils was noted for Group 3, tank-car spot material.

Atlantic Seaboard

Prices of heavy fuel oils along the Eastern Seaboard pointed downward to somewhat lower levels last week as a result of record-breaking stocks and improved supply conditions.

Socony-Vacuum, a major marketer in New York and New England, followed Esso Standard in a 25-cent per barrel reduction of heavy fuel oils at all Atlantic seaboard terminals. Socony-Vacuum also advanced gasoline prices in varying amounts up to ½ cent per gallon throughout the East.

Despite these cuts, which were followed by other suppliers, the residual fuel-oil market was described as "sloppy" with offers of material reported at prices below official postings. No. 2 was moving at about 9 cents on the spot market in New York Harbor.

Mid-Continent Area

Spot-market trading in petroleum products in the Mid-Continent area last week continued generally slow with little activity being reported. One supplier reported that natural gasoline was continuing firm and that demand was strong, particularly for this time of year.

Price levels in some petroleum products continued weakening last week as noted in published prices for spot sales, f.o.b. Group 3, tank car. Changes included: Reduction of ⅛ cent per gallon on gasoline making the spread for housebrand gasoline 10¼ to 10⅝ cents per gallon; reduction of ⅛ cent on ordinary gas oil, 32-36, to 7⅜ to 7¾ cents per gallon; and reduction of ⅛ cent on the high for No. 1, No. 2, No. 3, and Zero gas oil, 32-36. One buyer reported that housebrand gasoline was "fairly easy" to obtain at 9½ cents.

Gulf Coast Area

Spot trading on the Gulf Coast remained relatively quiet last week. However, demand for gasoline was said to be continuing good and that the holiday period was characterized by some strengthening in the gasoline market. The sluggish market for residual has prompted some refiners to cut back on their runs recently. Few buyers were reported anxious to do business and would not quote taking prices. Heavy fuel-oil prices continued to decline.

Representative Quotations

Representative spot-market quotations of leading suppliers as of January 6, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10-10¼	11.8-12* 10.5-11.9†	10¼-11½
Premium gasoline, 78-80 octane	10¾-11	10.6-13.4	11-12¼
42-44 w.w. kerosine	9¼-9½	10.3-	9½-10¼
No. 2 straw fuel oil	8¼-8¾	9.1-	9- 9½
No. 6 residual	$1.50-1.60	$2.83-2.90	$2.20-2.52

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	2[illegible]
200 vis. No. 3 neutral, 0-10 pp.	17

Western Pennsylvania

144-155 vis. 10 p.t. bright stock	30.5-40.5
180 vis. p.t. neutral	29.5-38.5

CRUDE-SCALE WAX

Mid-Continent

132-134 A.M.P.	8½

EQUIPMENT MEN ... in the News

Foor Engineering Expands Service

P. A. FOOR

R. T. FOOR

Foor Construction Co., Oklahoma City, becomes Foor Engineering Co., as of January 1, a partnership between P. A. Foor and his son, R. T. Foor. The company, established in 1946, specializes in heavy types of construction for the petroleum industry. Enlarged services for the petroleum industry are being inaugurated with the announcement of the new firm name.

P. A. Foor was construction superintendent for Shell Oil Co., Inc., for many years and later spent several more years in the same capacity for Dresser Engineering Co. at Tulsa. R. T. Foor has a degree in petroleum engineering from Oklahoma University and has recently completed work in chemical engineering.

The company is now completing a series of pump stations for Sinclair on its products pipe line from the Gulf of Mexico to Kansas City. It will engage in the construction of gasoline plants, refineries, compressor stations, resulfurization units, and other processing facilities. P. A. Foor has originated a special gin pole and set of rigging equipment for raising pressure vessels said to combine new safety features not previously used in the industry.

Fluor-Lewis Dissolve

J. S. (Si) Fluor, Jr., has announced the dissolution of Fluor-Lewis Co., effective immediately. Fluor associated for many years with his late brother, Peter, in the management and ownership of Fluor Corp., severed his connections there 2 years ago and with Lewis established a company to represent E. B. Badger & Sons, engineers and contractors to the oil industry.

Fluor-Lewis operations covered the entire Pacific Coast. Fluor, who has large agricultural interests in the southern part of California and who also retains a stock interest in Fluor Corp., has not stated whether he will retire from active business, or announce a new connection of interest to the oil industry.

Ray Miller Takes Hydra-Line Post

RAY MILLER

Hydra-Line Division of Johnston Enterprises has appointed Ray Miller as chief hydraulic engineer. Miller spent 10 years with Vickers, Inc., as chief of the control design group and is responsible for many of the precision hydraulic controls for direction, position, pressure, and sequence which are used in the machine-tool industry.

His background also includes experience with Bendix where he directed the development of precise aircraft hydraulic controls during the war. In his present position he will direct the hydraulic division of Hydra-Line's engineering group.

Los Angeles Nomads Induct New Members

Ted Sutter, Baker Oil Tools, Inc., officiated at a recent meeting of the Los Angeles chapter of Nomads at which four new members were inducted into membership of the organization. These included Robert W. Shira, Patterson-Ballagh; Donald O. Hanson, The Oil and Gas Journal; W. A. Thompson, Jr., Petroleum Maintenance Co.; Ray W. Elliott, Elliott Manufacturing Co.

Foreign guests who attended the meeting included G. K. Monteney, Trinidad Petroleum Development Co.; M. D. Freeland, Bahrein Petroleum Co., Ltd.; C. D. Hendershott, Bahrein Petroleum Co., Ltd.; and M. H. Jackson, Brown Drilling Co.

Attapulgus Clay Makes Cole Division Manager

Irving A. Cole has been appointed manager of technical division by Attapulgus Clay Co., Camden, N. J. Cole previously was in the sales department where he specialized in technical aspects in the development of new fullers earth and bauxite products.

Prior to joining Attapulgus in 1946, he was associated with the research and development department of Atlantic Refining Co. at Port Arthur and Philadelphia.

Murphy Appoints Capps

L. O. CAPPS

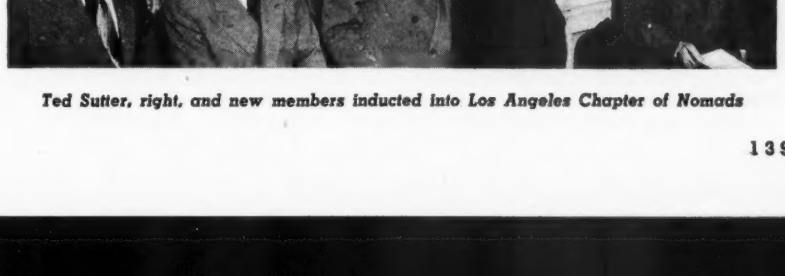
Frank W. Murphy, manufacturer of engine and pump controls, Tulsa, has appointed Lloyd O. Capps as Texas and New Mexico representative.

Capps will be located in Dallas, and will specialize in sales and service of water and oil level controls for condenser-cooled pumping engines.

Kobe Promotes Snedeker

Promotion of K. D. Snedeker to assistant manager of the West Texas district has been announced by Kobe, Inc. Located at Brownfield, he is responsible for Kobe's operations in the northern fields of West Texas.

Snedeker joined Kobe, Inc., in 1943, after 10 years in the production de-



Ted Sutter, right, and new members inducted into Los Angeles Chapter of Nomads

partment of Phillips Petroleum Co. Part of that time he supervised the operation of Kobe hydraulic equipment. His first Kobe assignment was with the technical service section at Oklahoma City. In 1944 he was transferred to West Texas.

Paschall Becomes Smith Exclusive Representative

Appointment of Hearn J. Paschall as exclusive representative for H. C. Smith Oil Tool Co. in South America has been announced. He will make his headquarters in Caracas, Venezuela. Paschall has been associated with H. C. Smith Oil Tool Co. for 11 years. For the past year he has been division manager for Mississippi. Two years ago he made an extensive tour of the various oil fields throughout the Middle East for the company.

Williams Selected Chairman Pressure Piping Committee

The American Society of Mechanical Engineers has selected Frank S. G. Williams of New York, eastern manager of Taylor Forge & Pipe Works, as chairman of A. S. A. Sectional Committee B-31, which is responsible for the American Standard Code for Pressure Piping.

Hercules Makes Keplinger Executive Vice President

John C. Keplinger, vice president in charge of sales of Hercules Motors Corp., Canton, Ohio, has been promoted to executive vice president of the company.

He has been associated with Hercules since 1926 and has served progressively as a member of the sales staff, sales manager, and vice president in charge of sales. He will continue to direct the sales activities of the company.

Other officers include Gordon M. Mather, chairman of the board; Charles Balough, president and general manager; M. C. Kuepfer, vice president of production; A. R. Miller, vice president of purchasing and traffic; D. W. Latta, vice president of special engineering; Harry P. Blake, vice president, and John D. Cook, secretary-treasurer.

New Pacific Valves, Inc., plant and office quarters cover 37,000 sq. ft.

Pacific Valve Moves Into Larger Quarters

Pacific Valves, Inc., recently moved into new quarters in Long Beach, Calif., estimated to have cost over $750,000. Considerable new specialized machinery and equipment has been installed in the new plant, which covers over 37,000 sq. ft. including the office building.

Pacific manufactures a complete line of cast-steel valves and maintains a valve-repair and reconditioning service for all types and kinds of valves. The company, formerly Pacific Valve & Pump Co., is owned and operated by four Dumm brothers, Irving, Howard, Robert, and Jack, and maintains sales offices in San Francisco, Houston, Beaumont, Tulsa, Denver, Cleveland, St. Louis, Chicago, and New York City.

Schlumberger Opens New Field Branch

Schlumberger Well Surveying Corp. has recently opened its sixty-seventh field branch service office in Eastland, Tex. Roger Henquet, vice president and general manager, and R. D. Ford, public relations manager, flew to Eastland for opening-day activities in connection with the new branch opening.

E. H. Culbertson, formerly in the Wichita Falls area for Schlumberger, has been promoted to district manager of the Eastland operation.

McGuiness Becomes Vice President Hewitt-Robins

Bernard H. McGuiness, for 3 years works manager of the Passaic, N. J., plant of Hewitt-Robins, Inc., materials-handling machinery manufacturers, has been appointed vice president of the company's Robins Conveyors Division. McGuiness, who joined the company in 1923, was for many years general superintendent of installations of Robins Conveyors Division.

Ervin Elected Director Of National Association

T. C. Ervin, president of the Lucey Boiler & Manufacturing Corp., Chattanooga., has been elected director of the National Association of Manufacurers. He is chairman of the A.P.I. subcommittee on boilers, past president of the Chattanooga Manufacturers Association, a member of the American Society of Mechanical Engineers, and a director of Pioneer Bank of Chattanooga.

McCarty Joins Iverson

J. W. McCARTY

Ed Robertson, sales manager for Iverson Supply Co., has appointed J. W. (Joe) McCarty to the Iverson sales staff. He has previously been associated with Franklin Supply Co., Bethlehem Supply Co. and Manning, Maxwell & Moore, Inc. McCarty will have headquarters at the general office in Tulsa.

Arnold Appointed to Allegheny Ludlum Post

Creation of a new vice presidency of Allegheny Ludlum Steel Corp. and appointment of Robert M. Arnold, a director, to the position has been announced. Arnold is also president of Arnold Engineering Co., Chicago, a wholly owned subsidiary.

Arnold has served as a director of Allegheny Ludlum since 1946, and as president of Arnold Engineering Co. since 1941. His company was acquired by Allegheny Ludlum in 1946.

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SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 5 Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

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14" O.D.
30' to 40' lengths
Range 3
.375 WALL: 54.5 lbs. per ft.
Plain Ends

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THatcher 9243

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FOR SALE: 1—21½" OD by 20' Tulsa Type Gas Cooler, 600# Test through tubes, 250# Test around tubes. Fitted with 118 1", 10 Gauge Stainless Steel Tubes. $350. Cities Service Oil Co., Patridge, Bartlesville, Okla.

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Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

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Ada, Oklahoma

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San Antonio, Texas

or Frank Buchanan, c/o Al Buchanan Drilling Company, Box 1308, Alice, Texas

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11,000 ft. 24 inch

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SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000′—Respooled for Your Inspection — Cable Tools For Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

1—4,000′ POWER Rotary Drilling Rig complete with 87′ Moore Mast and Subbase. 2 EK Waukesha Motors with extension shafts (V-Belt), excellent condition. 6 x 16 Wilson Snyder Power Pump. 5 Drill Collars, Kelly, Etc. Will sell as one unit or separately. Phone 41213, Wichita, Kansas.

FOR SALE: One nearly new 2500 Watt A.C. Hercules Light plant with Onan generator, skid mounted in weatherproof housing, used less than one year; One Model XL 12 H.P. Hercules power unit with clutch attached; One 85 H.P. Model H.L. Waukesha Drilling unit with clutch attached, just overhauled; One detachable shear pole head with two sheave block attached; One set 2 inch, Fair pattern tubing elevators; One set 2½ inch, Fair pattern tubing elevators; One set safety rod elevators. All priced to sell. C. H. Barker, Box 91, Toronto, Kansas. Phone 41.

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Brand New—Sacrifice—At OEM's Cost 1103 cu. in., 6-cylinder, 180 HP, @ 1200 RPM. Never been used. 20% off list. Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

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complete with exciters, switchboards, etc. Mounted on a sub-base.

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Extra gaskets, valves, seats, heads, rods, and 1 set of 7¼ Emsco liner and 1 set of 6¾ Emsco liner.

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PATENT ATTORNEYS

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Reference .....

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1949

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Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich., January 10-14.

Society of Automotive Engineers, fuels and lubricants, Engineering Societies Building, New York, January 27.

Western Petroleum Refiners Association, regional technical-industrial relations meeting, Washington-Youree Hotel, Shreveport, La., January 28.

February

American Institute of Mining and Metallurgical Engineers, annual meeting, Fairmont Hotel, San Francisco, February 13-17.

American Society for Testing Materials, spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

National Association of Corrosion Engineers, annual convention, Cincinnati, Ohio, March 7-10.

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex., March 9-11.

American Association of Petroleum Geologists, regional meeting; Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, Jefferson Hotel, St. Louis, Mo., March 14-17.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association, thirty- seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting San Francisco, March 27-April 1.

April

American Petroleum Institute, division of Refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, annual convention, Netherlands Plaza Hotel, April 11-14, Cincinnati, Ohio.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

Amercian Petroleum Institute, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 27-29.

May

Independent Petroleum Association of America, midyear meeting, Roosevelt Hotel, New Orleans, La., May 3-4.

Amercian Gas Association, natural-gas department, spring meeting, French Lick Springs Hotel, French Lick, Ind., May 9-10.

American Petroleum Institute, division of production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, Calif., May 12-13.

Instrument Society of America, annual spring meeting, Royal York Hotel, Toronto, Canada, May 12-13.

Amercian Petroleum Institute, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., May 26-27.

Natural Gas and Petroleum Association of Canada, annual meeting, Hotel London, London, Ont., Canada, May 26-27.

June

American Society for Testing Materials, fifty-second annual meeting, Hotel Chalfonte Haddon Hall, Atlantic City, N. J. June 17-July 1.

September

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 14-16.

October

National Lubricating Grease Institute, Hotel Roosevelt, New Orleans, La., October 3-5.

American Gas Association, annual convention, Chicago, Ill., October 17-20.

NOMADS

Houston Nomads, second Monday of each month. The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month. Jonathan Club.

Water-Flood Group to Meet

A discussion of tank-battery problems in water-flooding operations and in the conditioning of oil for pipe-line sale will feature the monthly meeting of the Kansas-Oklahoma Water Flood Operators Group at the Booth Hotel, Independence, Kans., January 12. Representatives of Black, Sivalls & Bryson, Inc., will be the speakers.

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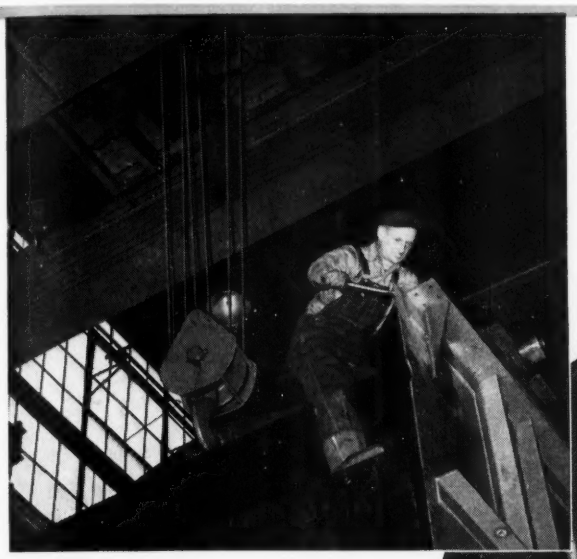
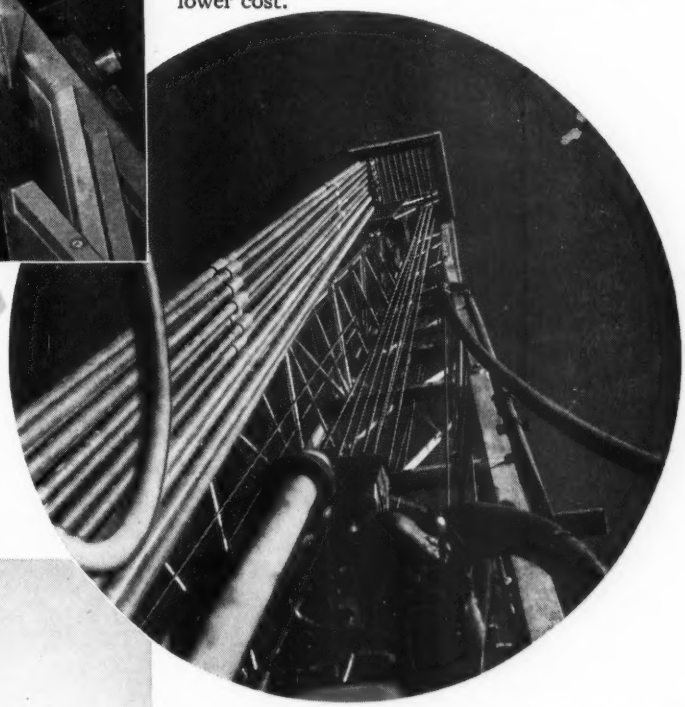
Improved Performance with LAY-SET PREFORMED



For heavy or light loads on overhead traveling cranes Hazard LAY-SET Preformed wire rope improves performance. Why? Because it operates smoothly over sheaves and drums . . . it spools evenly. It's relaxed, easy to handle. LAY-SET Preformed means longer life and lower cost.



Rotary oil well drilling requires a wire rope of the absolute best construction and grade. For years Hazard has furnished LAY-SET Preformed in 6 x 19 Seale construction, made of improved plow steel wires and with an independent wire rope center, for rotary drilling. The bigger outer wires wear longer, the center adds strength, and the preforming means better spooling on the drum.

Get up close to a shovel. Watch the bucket quiver and jerk as it is filled. Watch the lines rubbing against each other. Watch them bend by the hour around small sheaves. You'll see the reasons why LAY-SET Preformed 6 x 19 filler wire Lang-lay improved plow steel with independent wire rope center is needed for improved performance.

In the oil and logging fields, in marine, elevator, industrial, contracting, mining service there are correct constructions of Hazard LAY-SET *Preformed for every wire rope use.*

Specify LAY-SET Preformed next time.

ACCO *In Business for Your Safety*

TRADE MARK

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A DIVISION OF AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, Pittsburgh, San Francisco, Wichita, Bridgeport, Conn.

Each basic industry still has a big job to do—and petroleum is in the forefront of the drive. Keep your drilling, pipe-laying and refinery operations rolling with the aid of *Preformed* Yellow Strand. It's the flexible rotary line that handles round trips faster. The smooth-running casing line that resists kinking. The winch or hoist line that spools evenly and curtails drum-crushing. To get going and *stay* going, specify long-lived *Preformed* Yellow Strand.

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